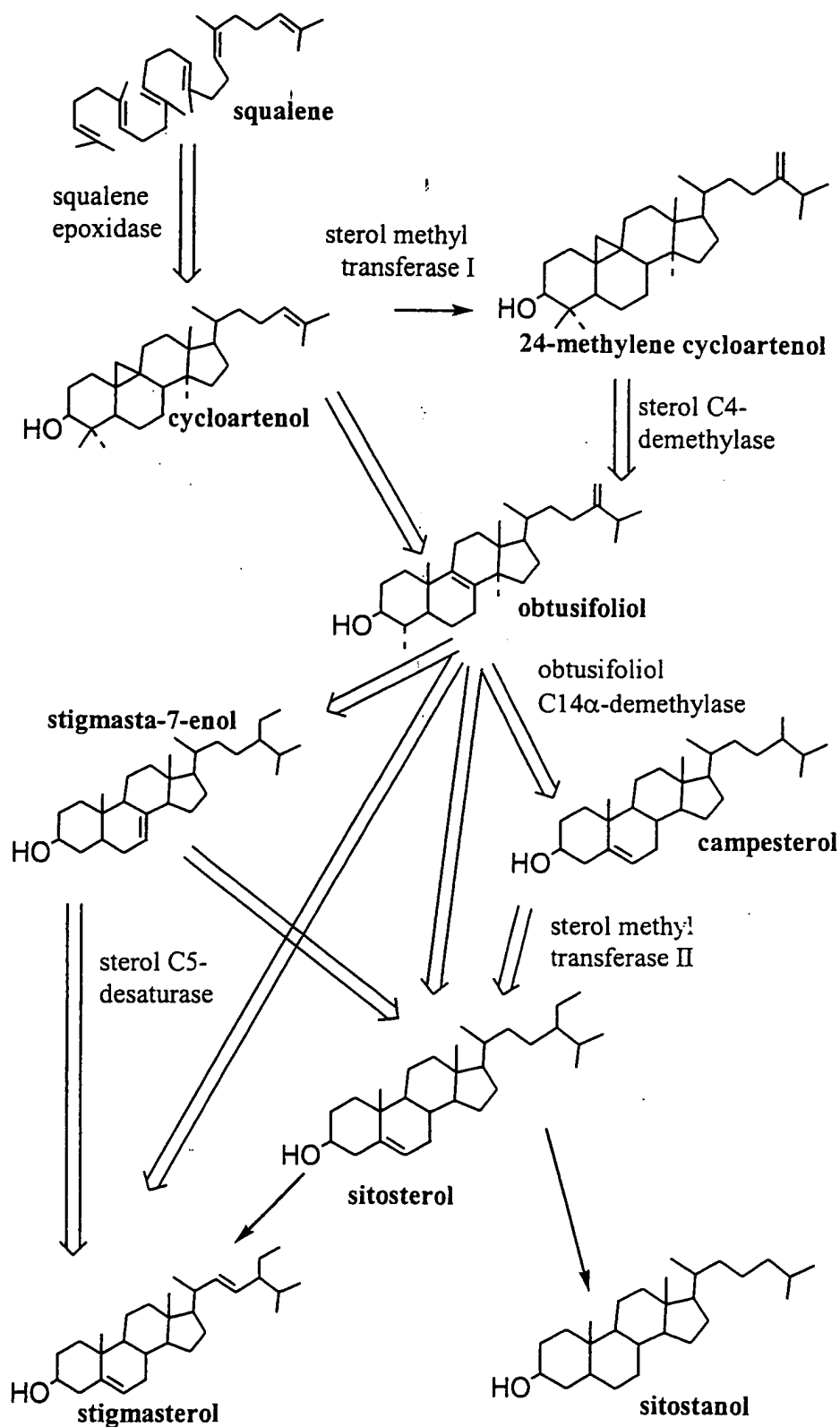


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FIG. 1



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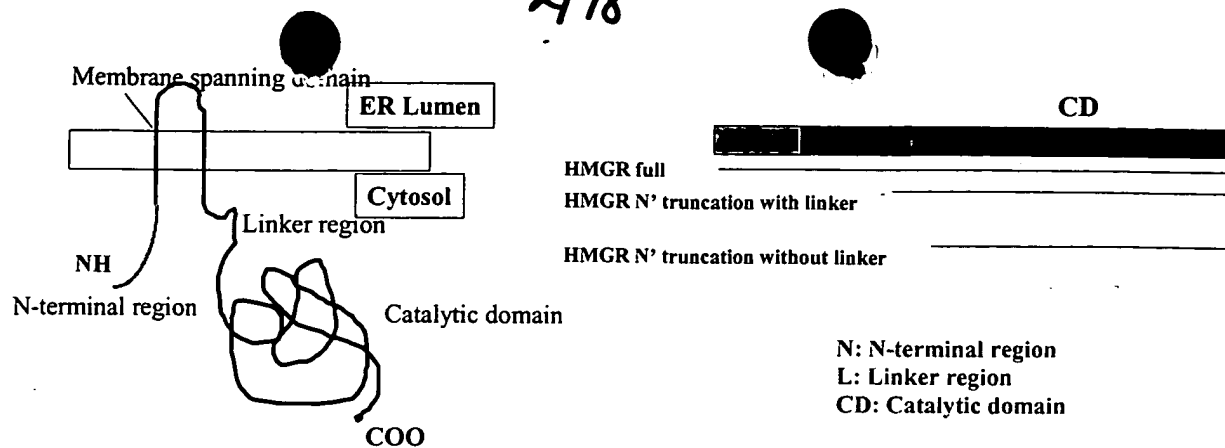


Figure 2: Forms of *Arabidopsis* and rubber HMGR1 tested in *Arabidopsis* and yeast to compare expression, activity and sterol production.

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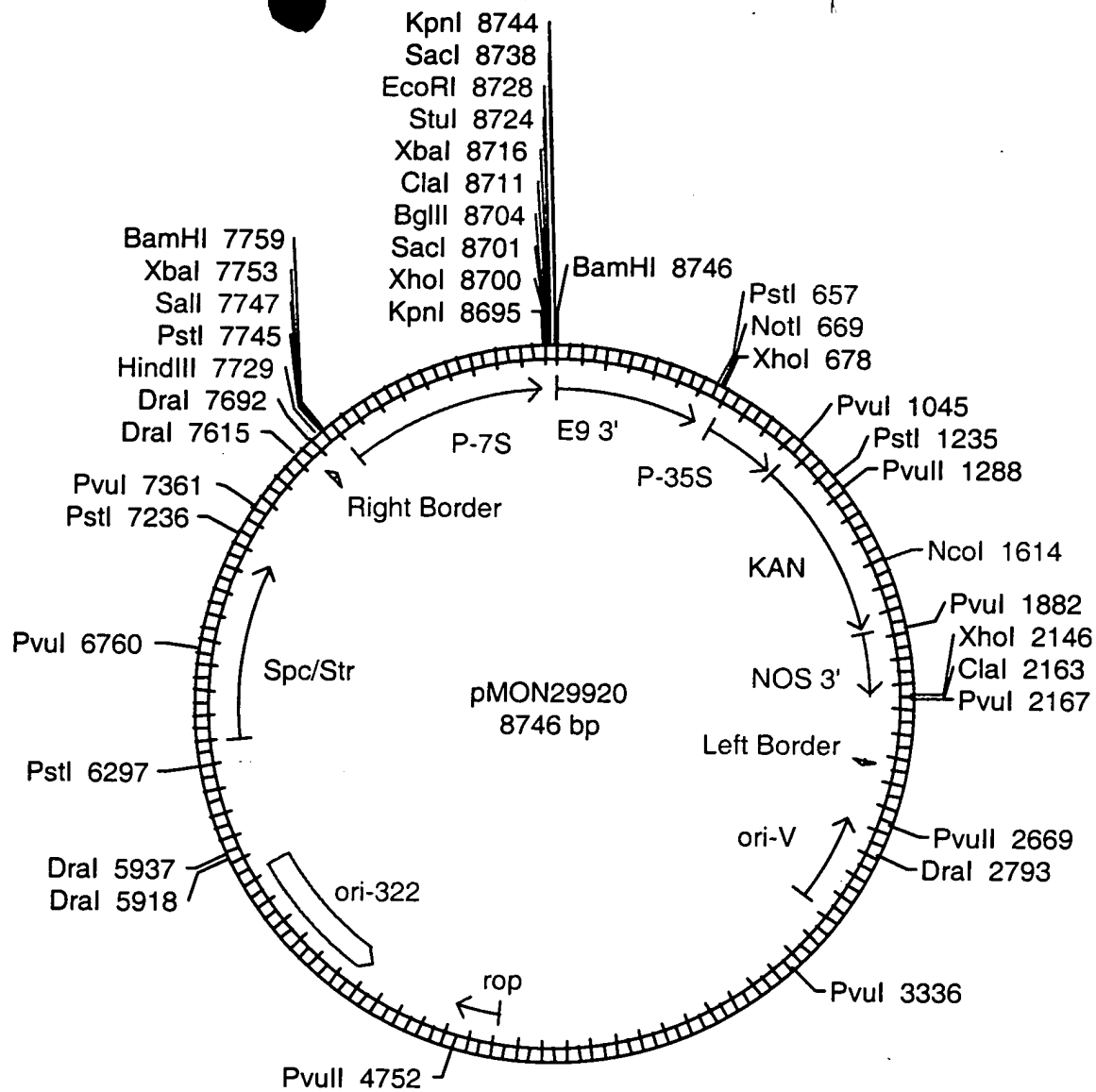
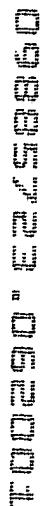


Figure 3: Construct pMON29920

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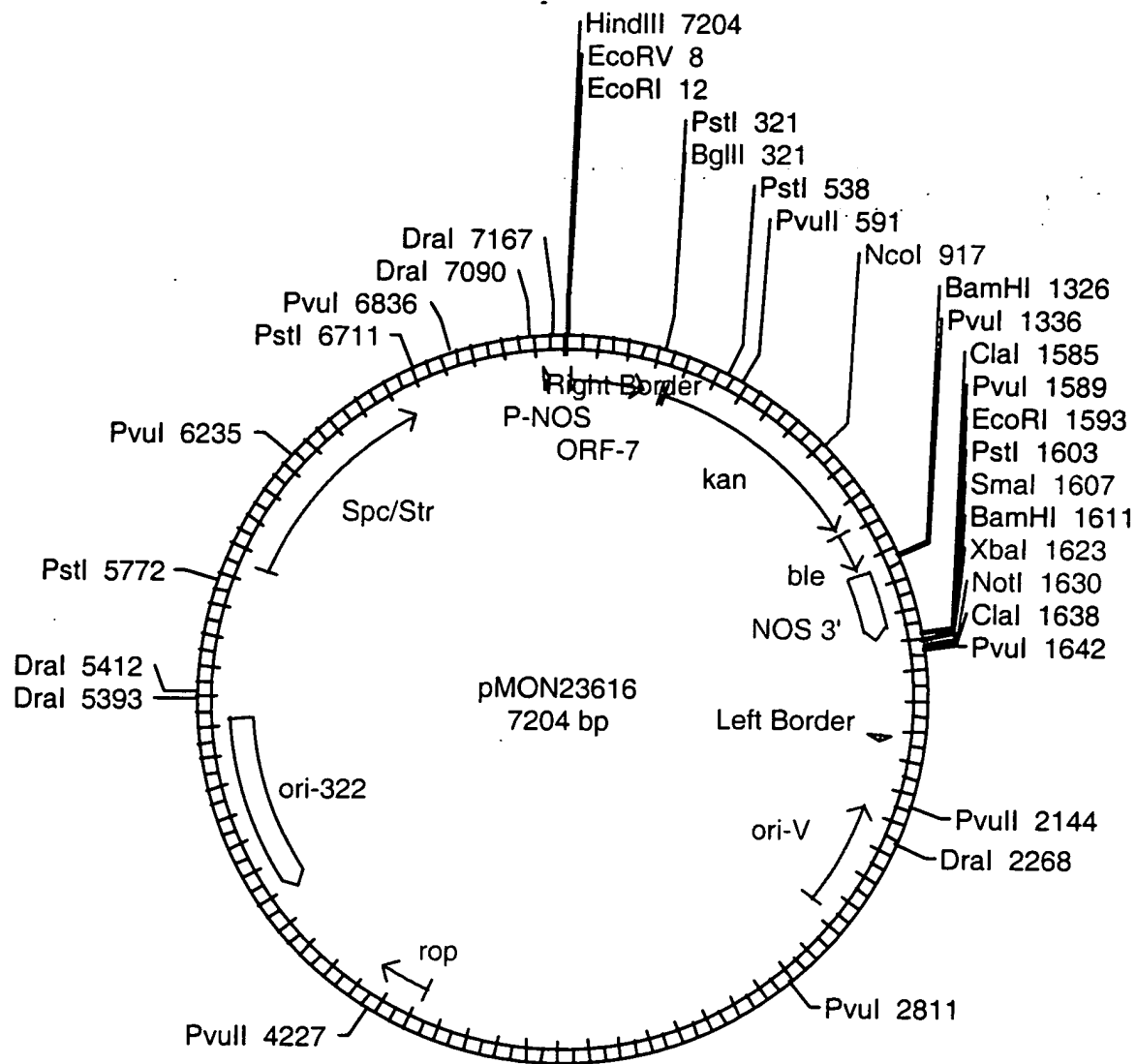


Figure 5: Construct pMON23616

0985723-05001

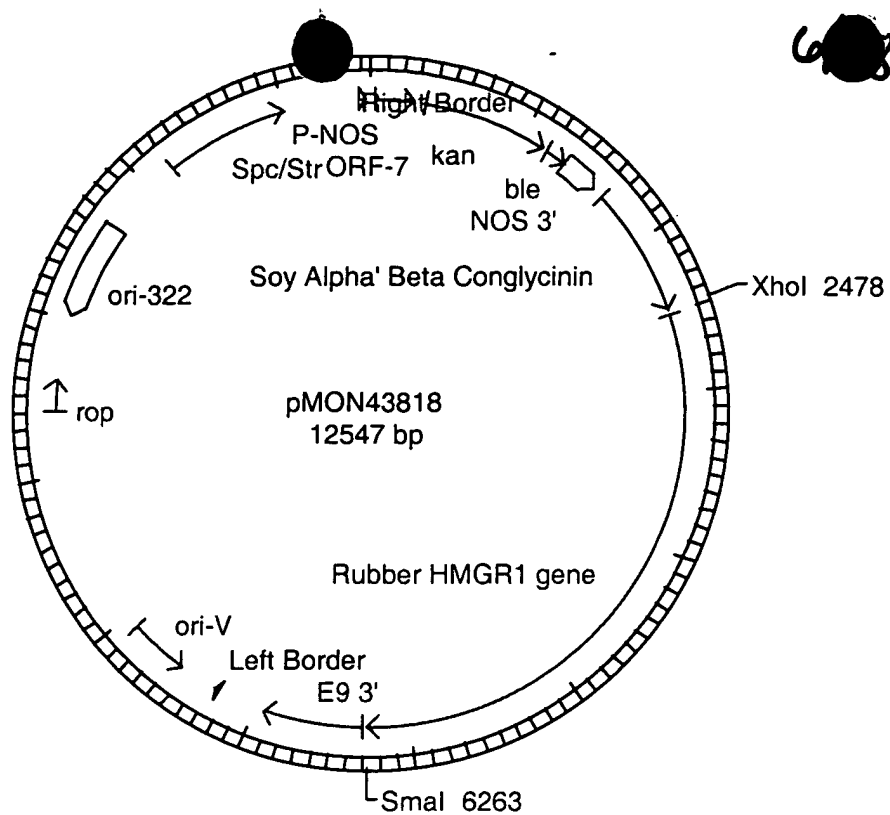


Figure 6: Construct pMON43818

0985723 062001

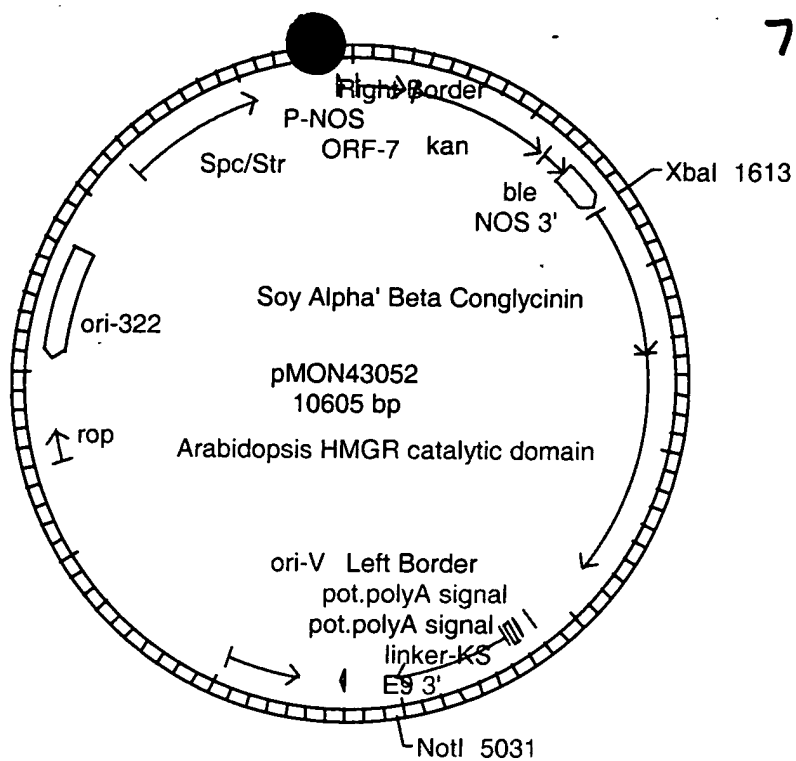


Figure 7: Construct pMON43052

09885723-062001

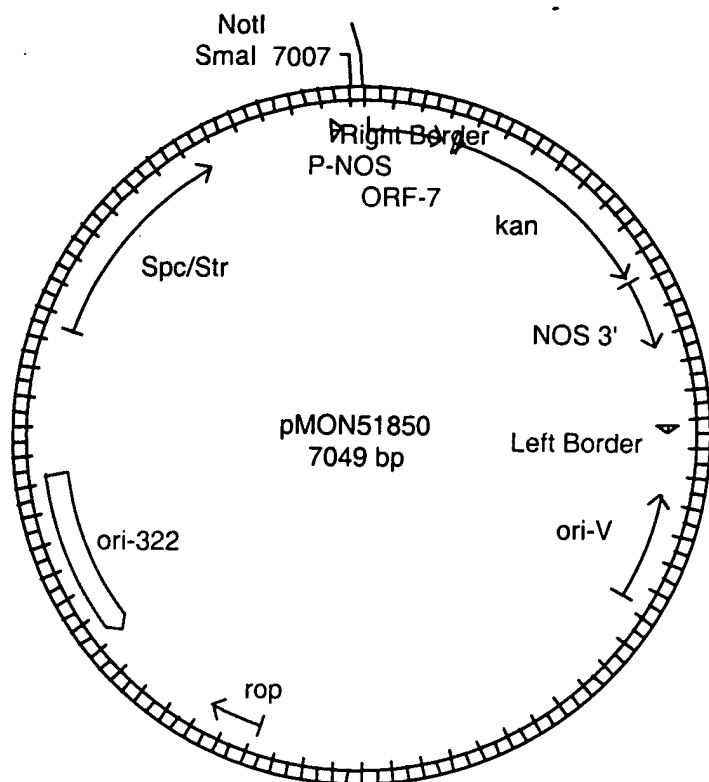


Figure 8: Construct pMON51850

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T00290-02758860

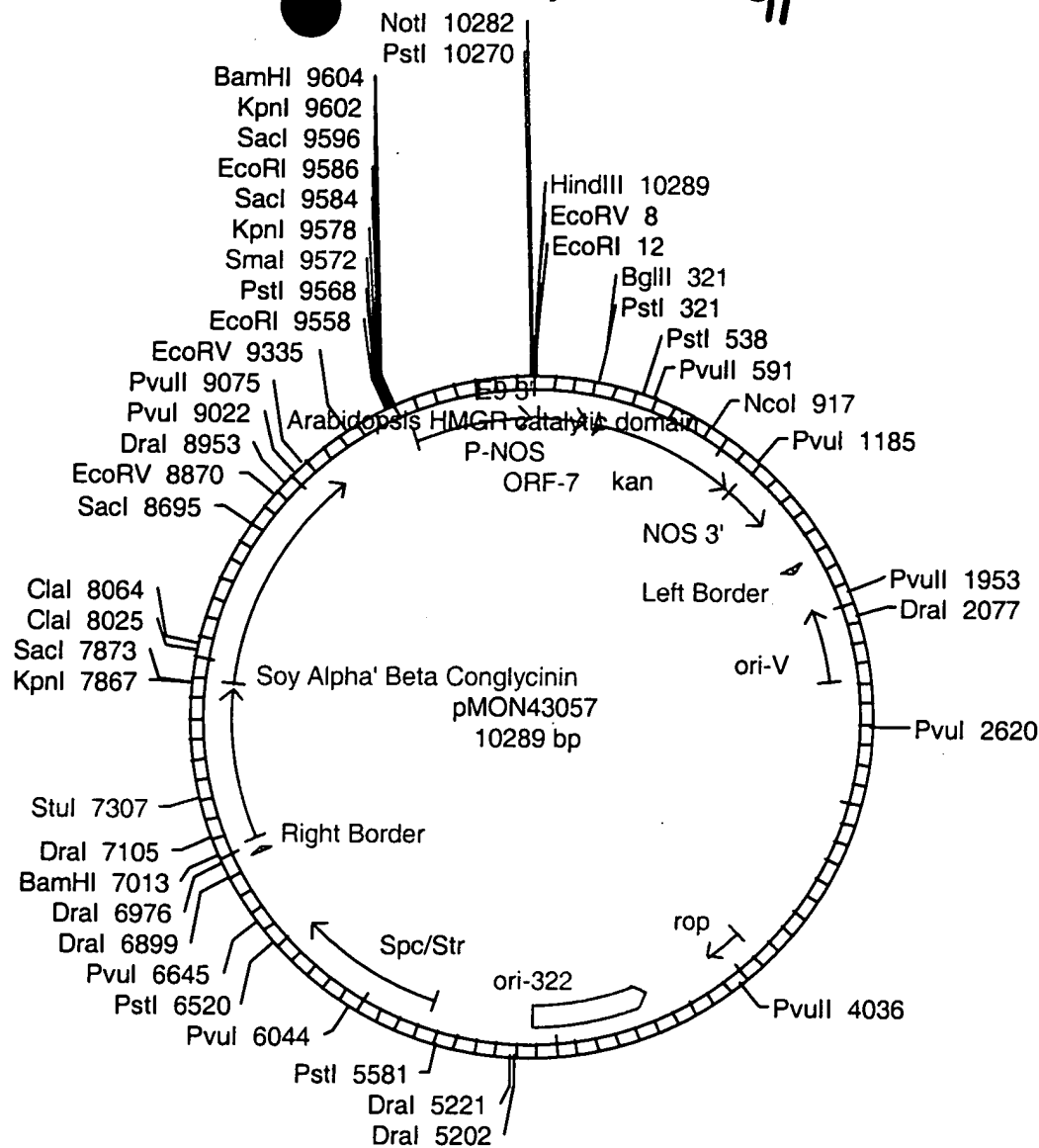


Figure 9: Construct pMON43057

09885723-062001

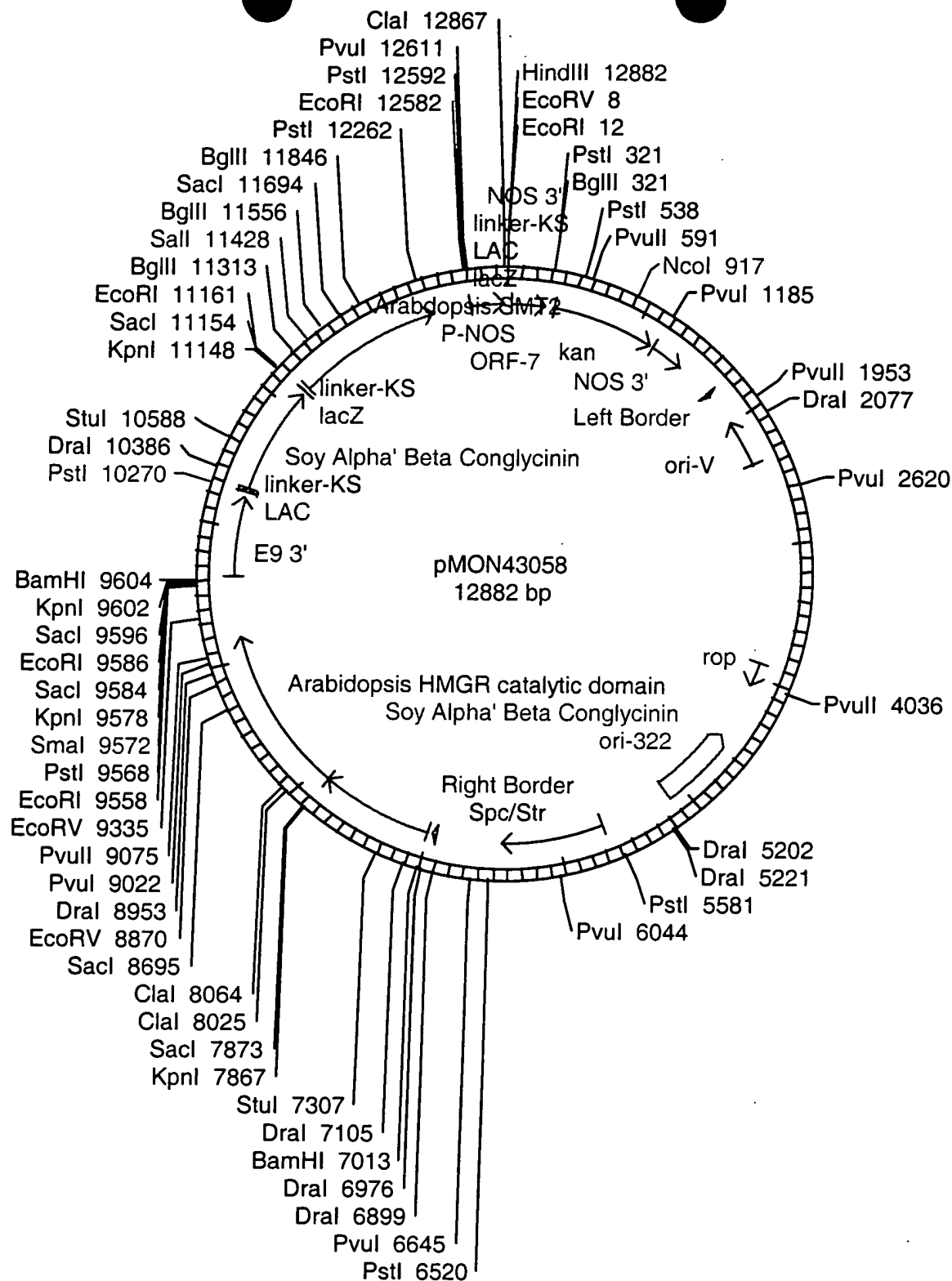


Figure 10: Construct pMON43058

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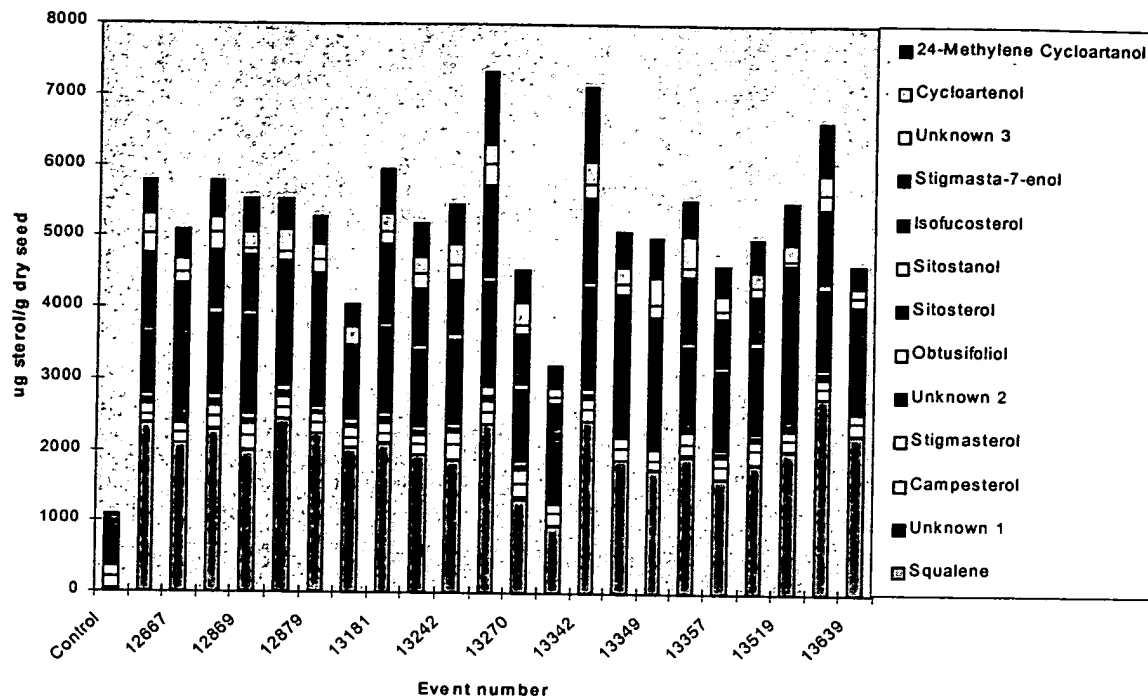


Figure 11: Sterol composition of R1 transgenic soybean seeds when *Arabidopsis* truncated HMGR (catalytic domain without linker) was overexpressed using seed-specific 7S promoter (data from pMON43057: p7s::At HMGR truncated).

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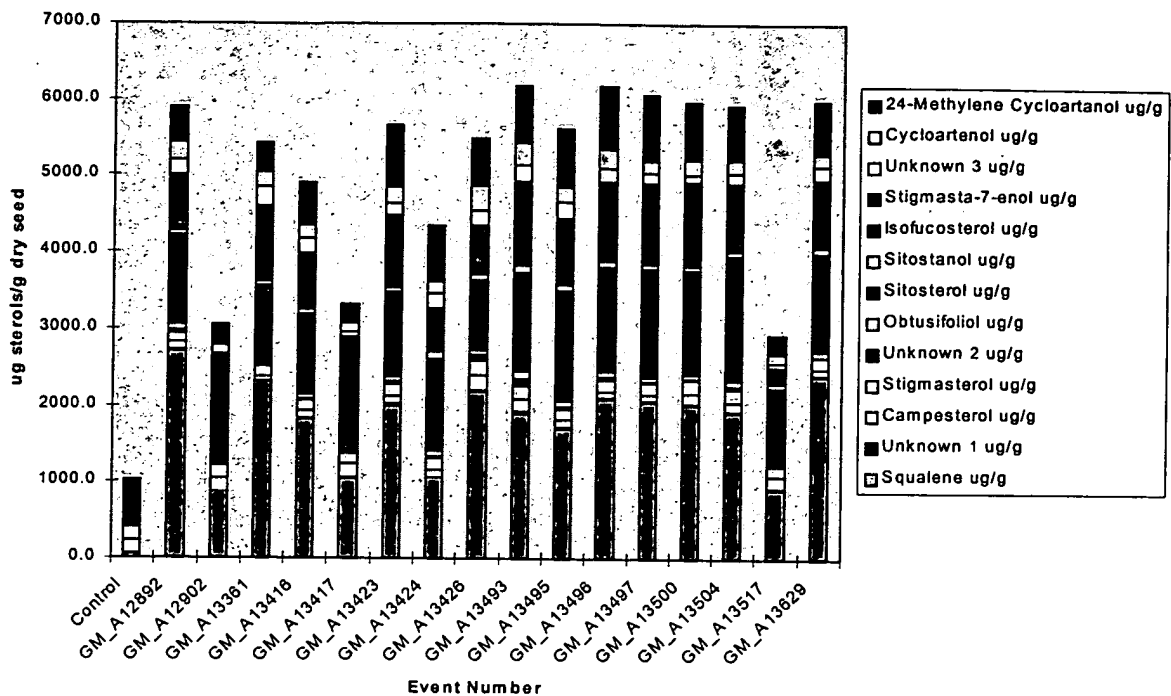


Figure 12: Sterol composition of R1 transgenic soybean seeds when *Arabidopsis* truncated HMGR (catalytic domain without linker) and *Arabidopsis* SMTII were overexpressed (data from pMON43058: p7S::At HMGR truncated & p7S::At SMTII). The expression of the genes is controlled by the seed-specific 7S promoter.

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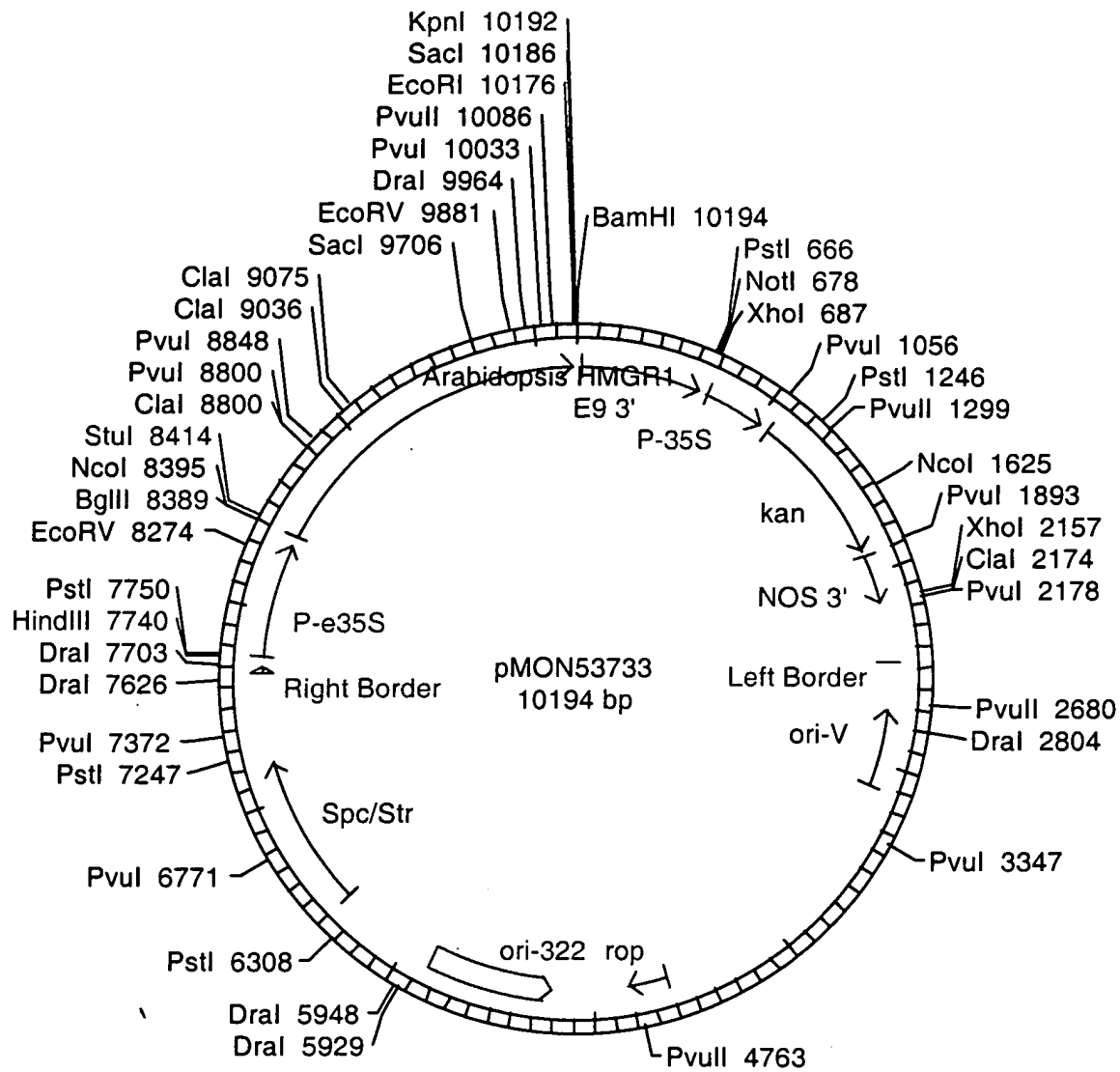


Figure 13: Construct pMON53733

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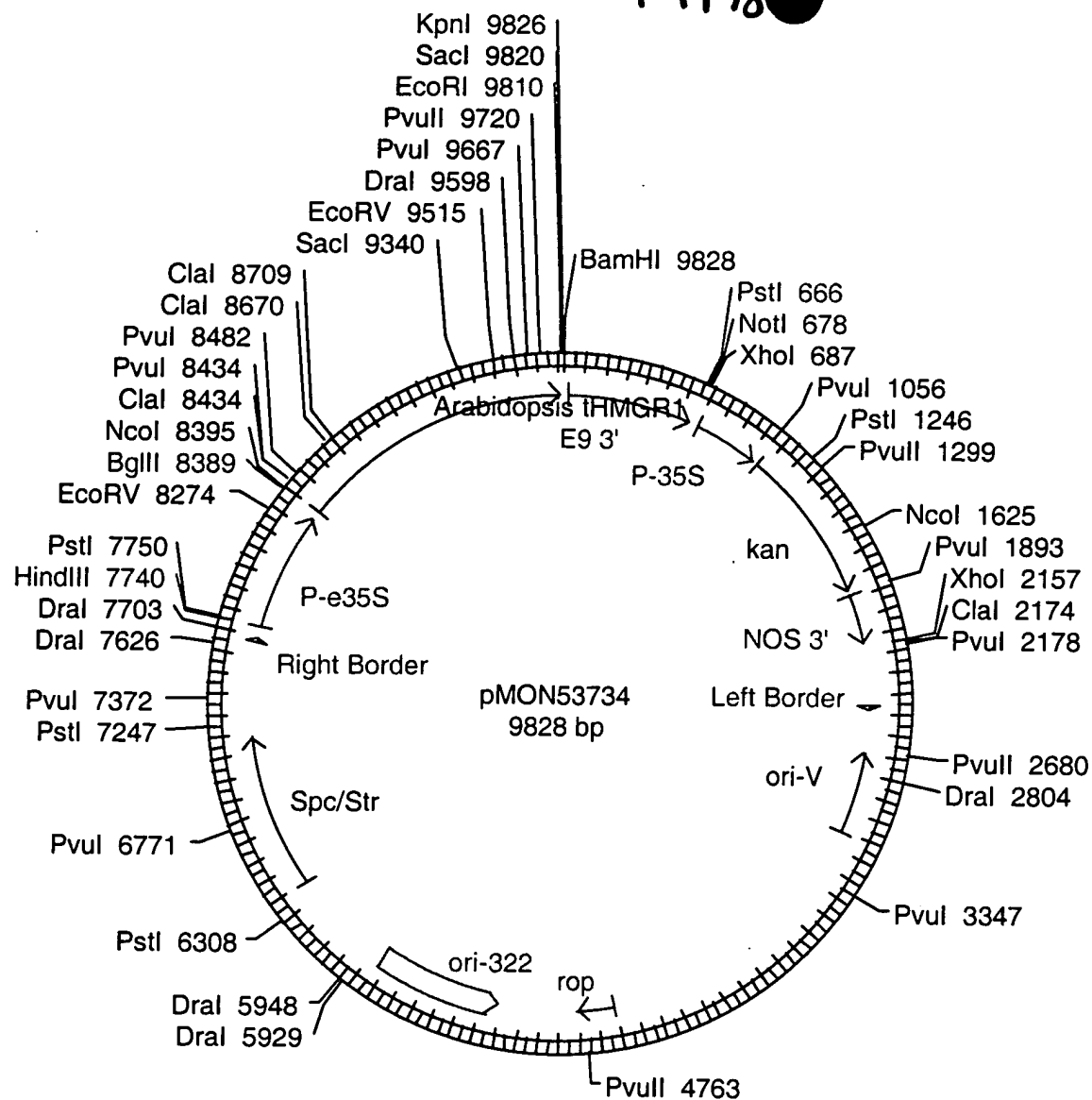


Figure 14: Construct pMON53734

100290-E245880

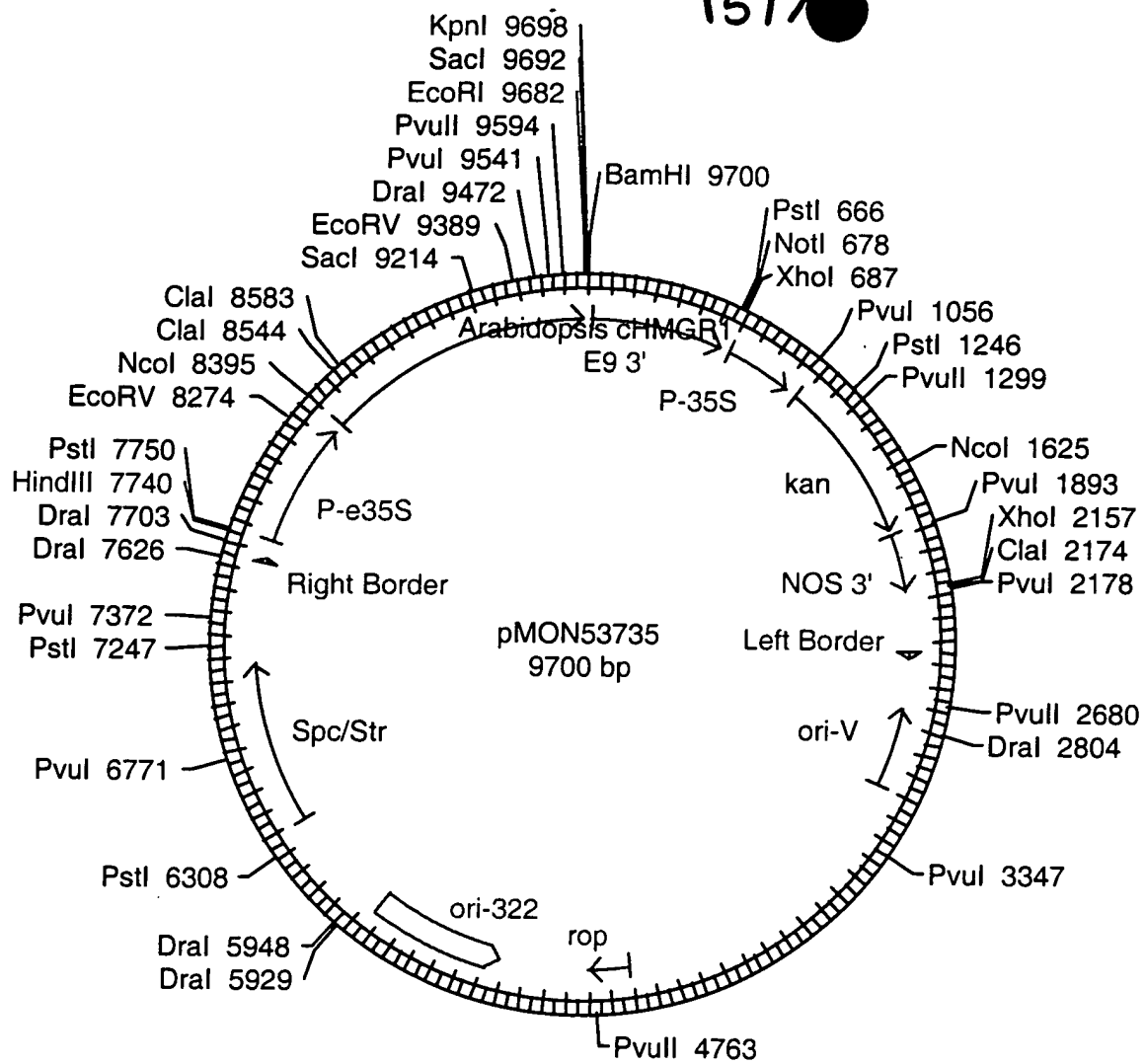


Figure 15: Construct pMON53735

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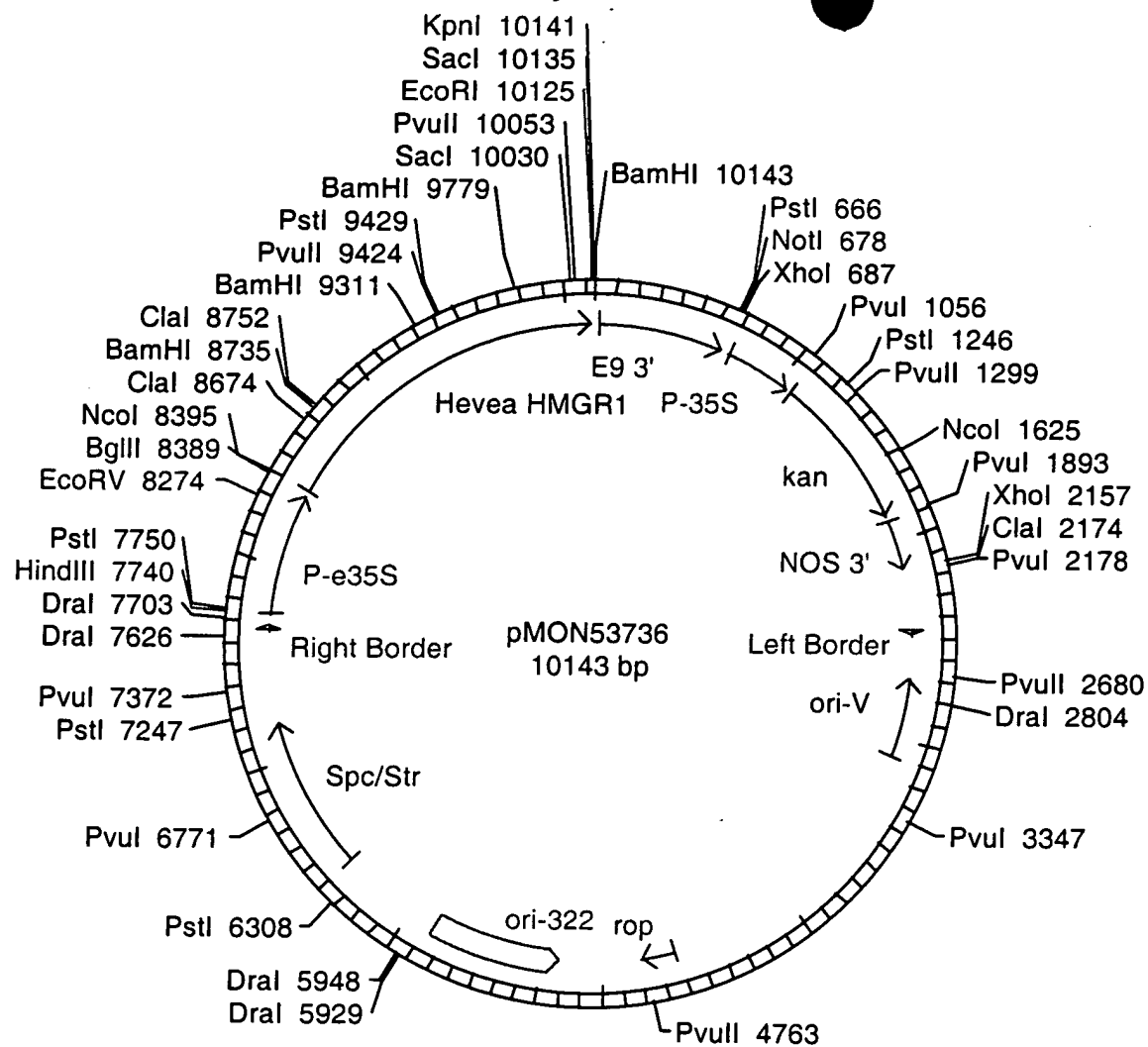


Figure 16: Construct pMON53736

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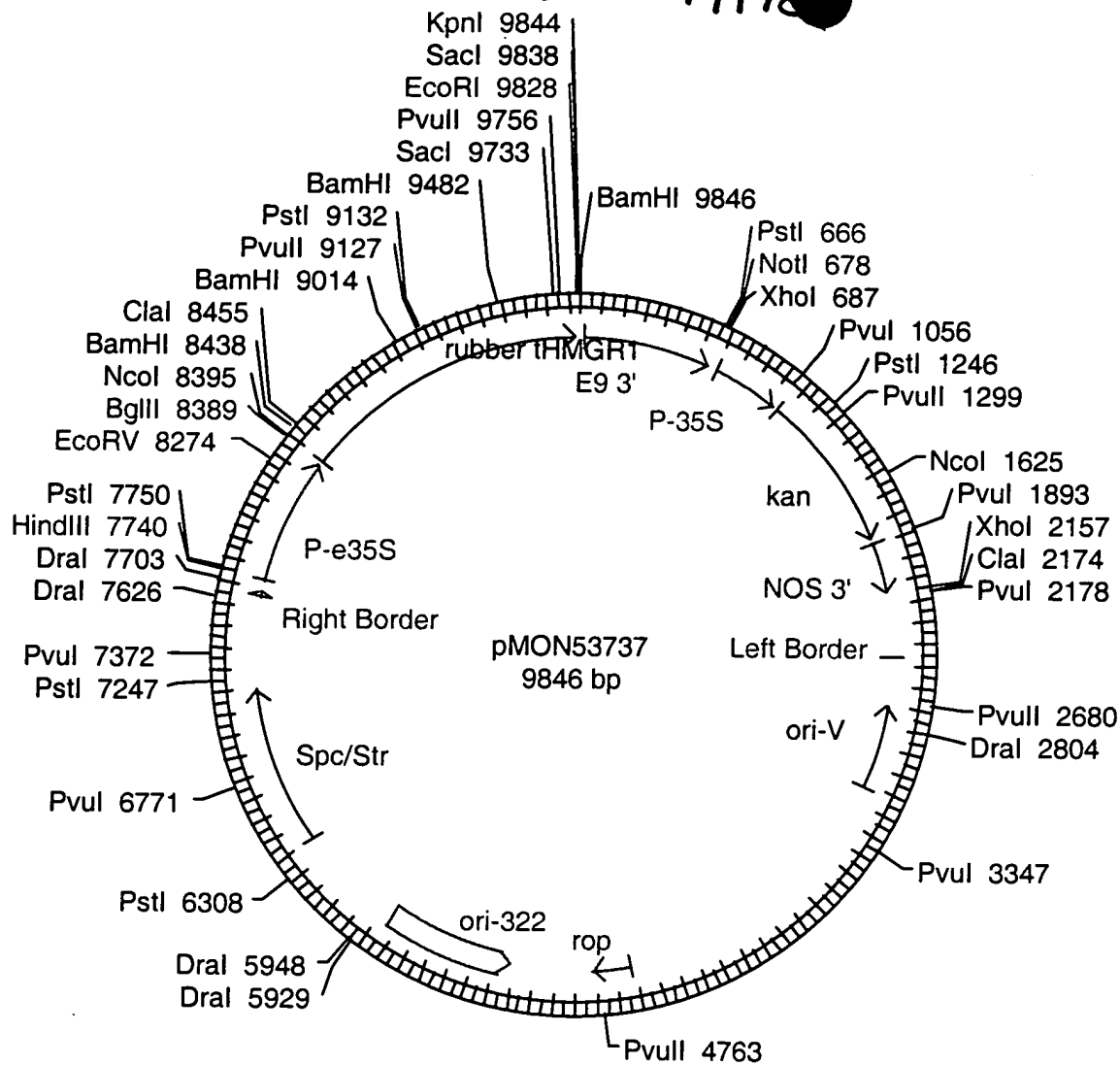


Figure 17: Construct pMON53737

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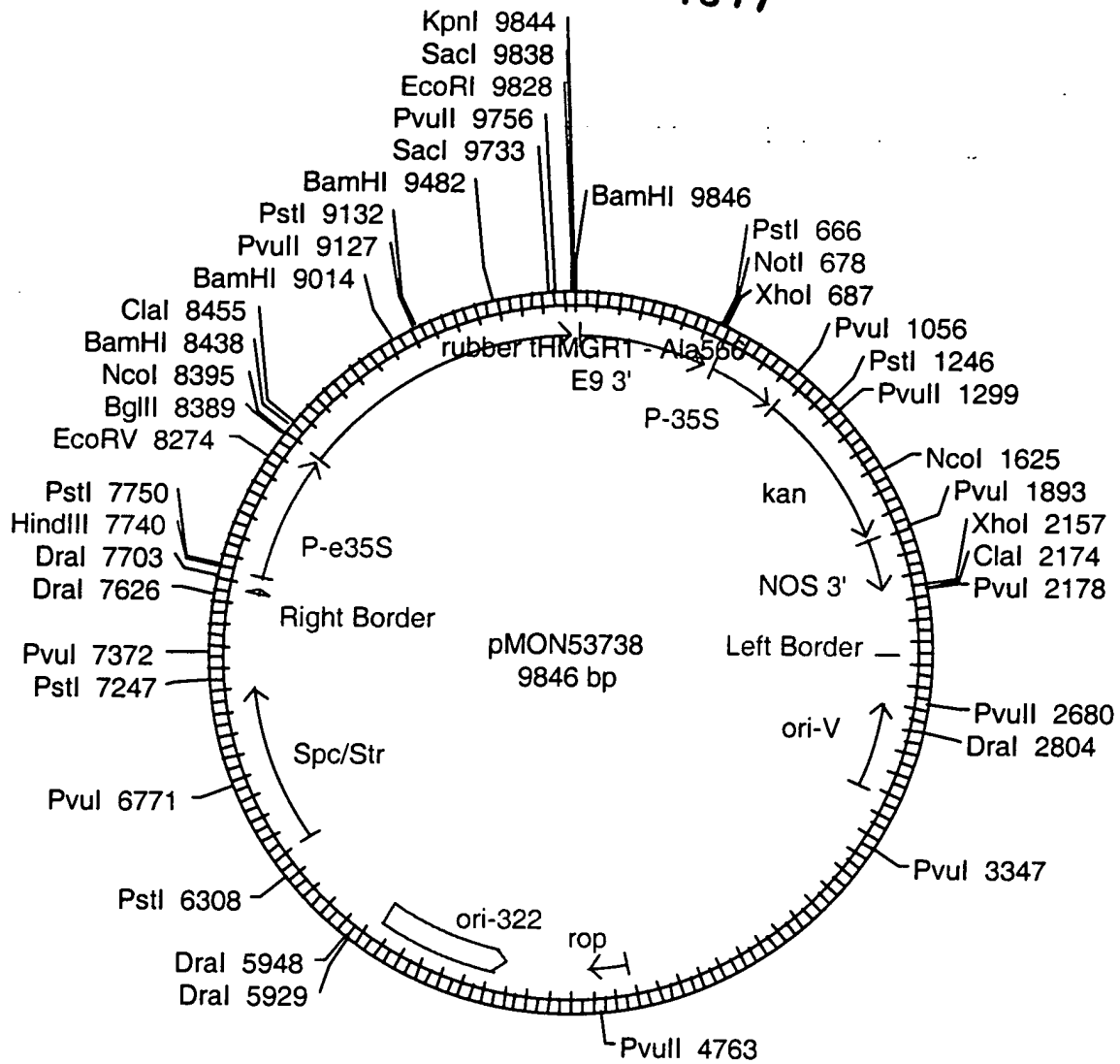


Figure 18: Construct pMON53738

000290"E2258860

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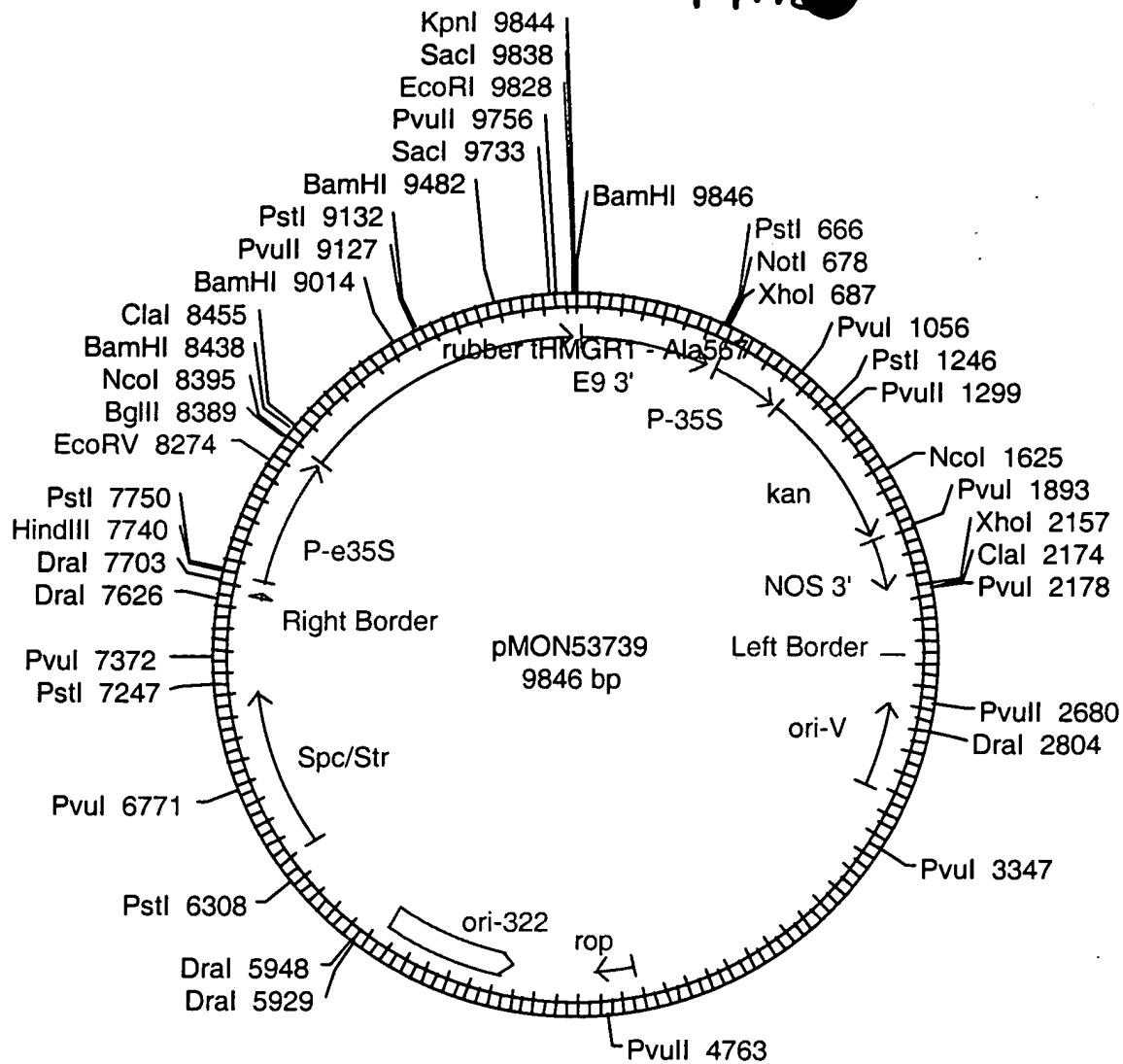


Figure 19: Construct pMON53739

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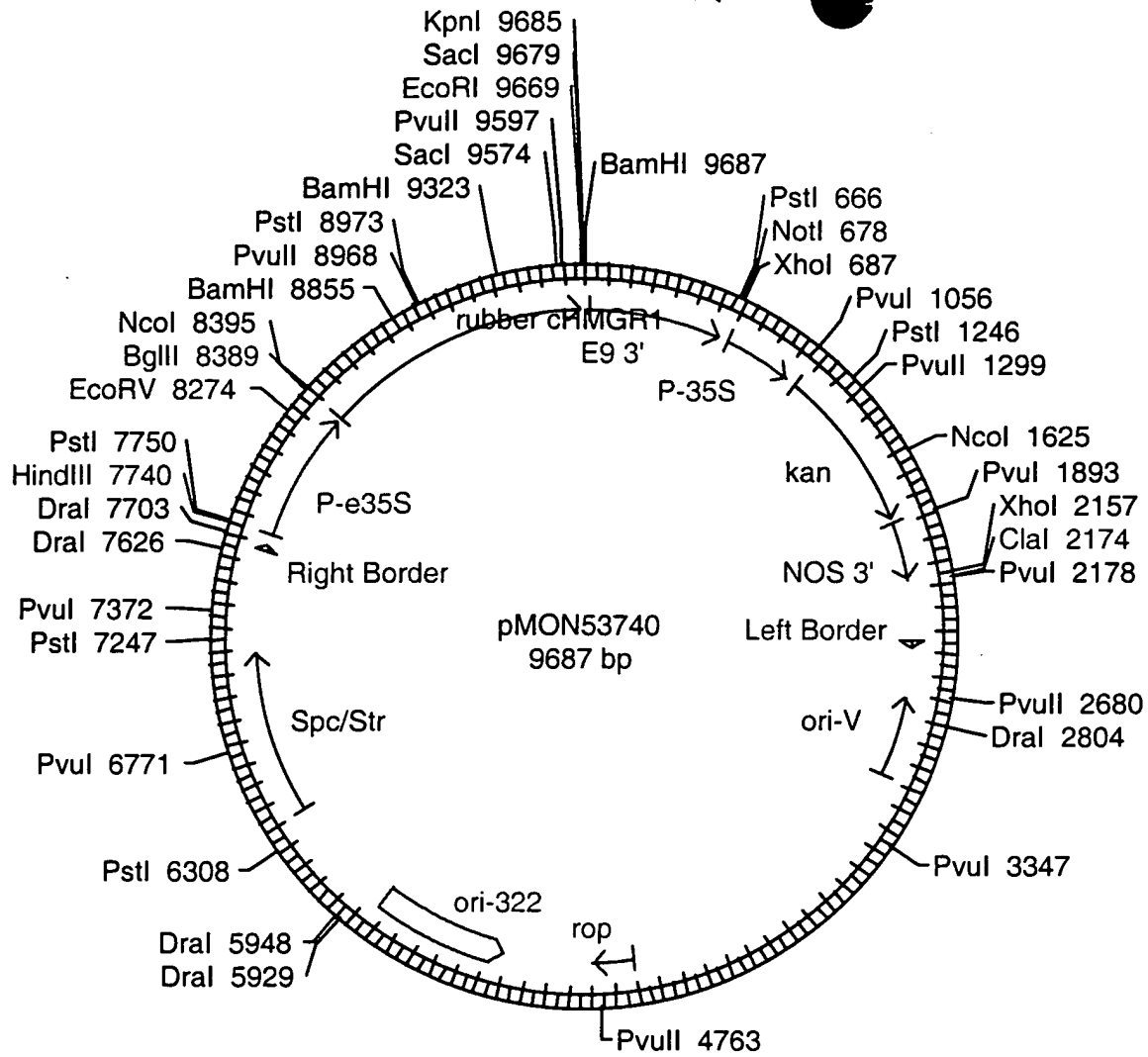


Figure 20: Construct pMON53740

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Comparison of Cycloartenol Levels in Transgenic Plants

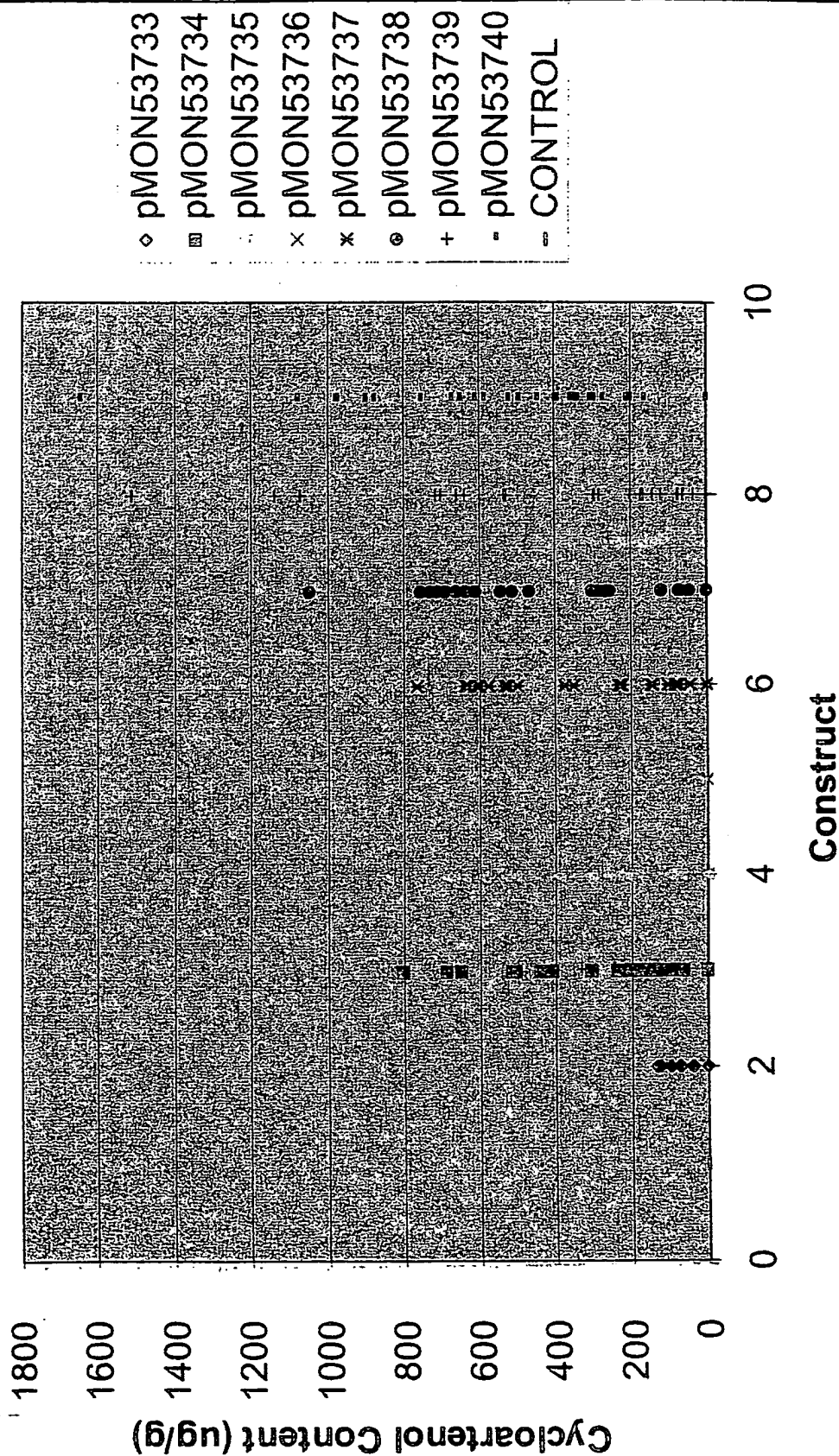


FIGURE 21

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Comparison of 24-Methylene Cycloartenol in Transgenic Plants

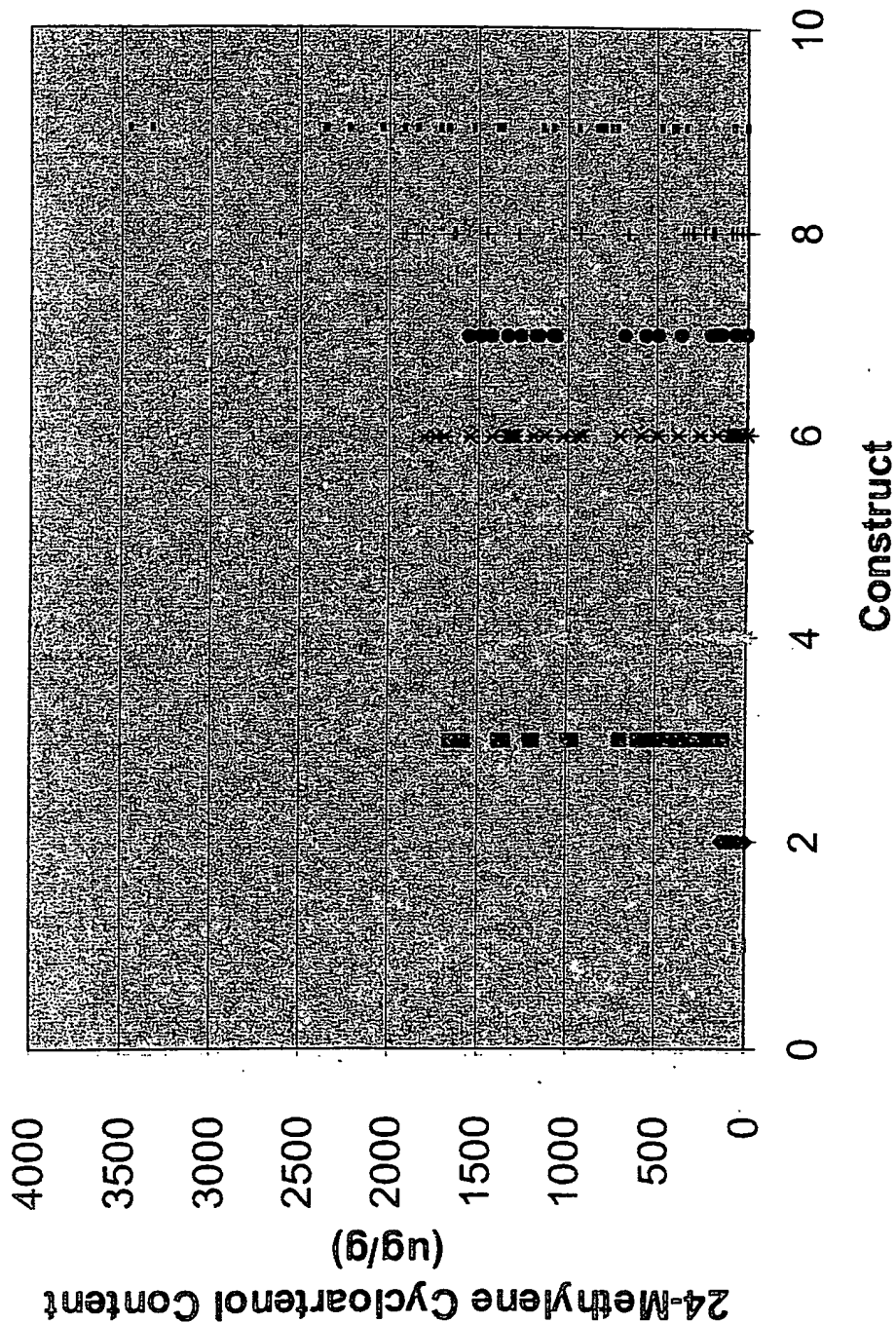


FIGURE 22

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Comparison of Campesterol Levels in Transgenic Plants

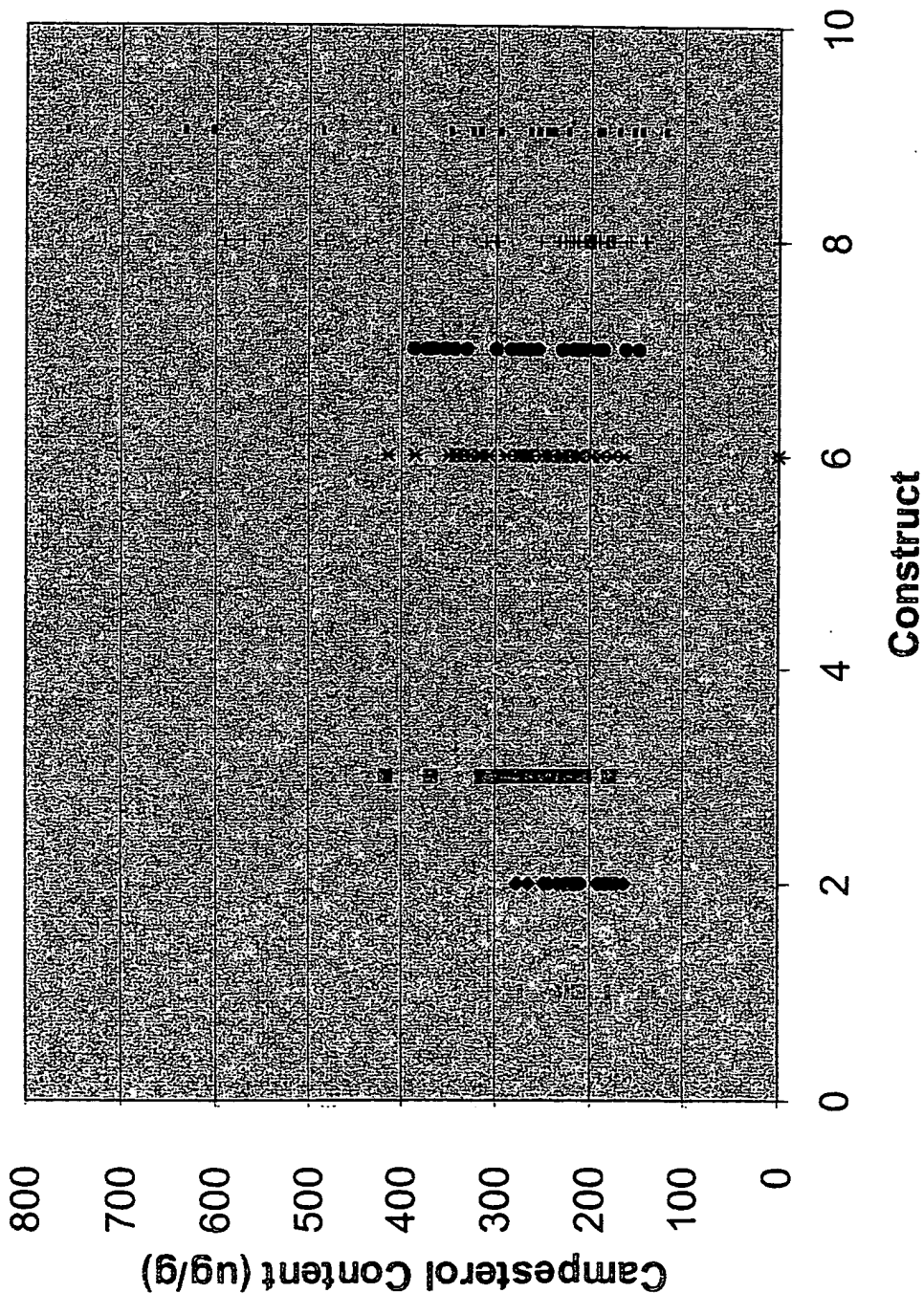


FIGURE 24

Comparison of Sitosterol Levels in Transgenic Plants

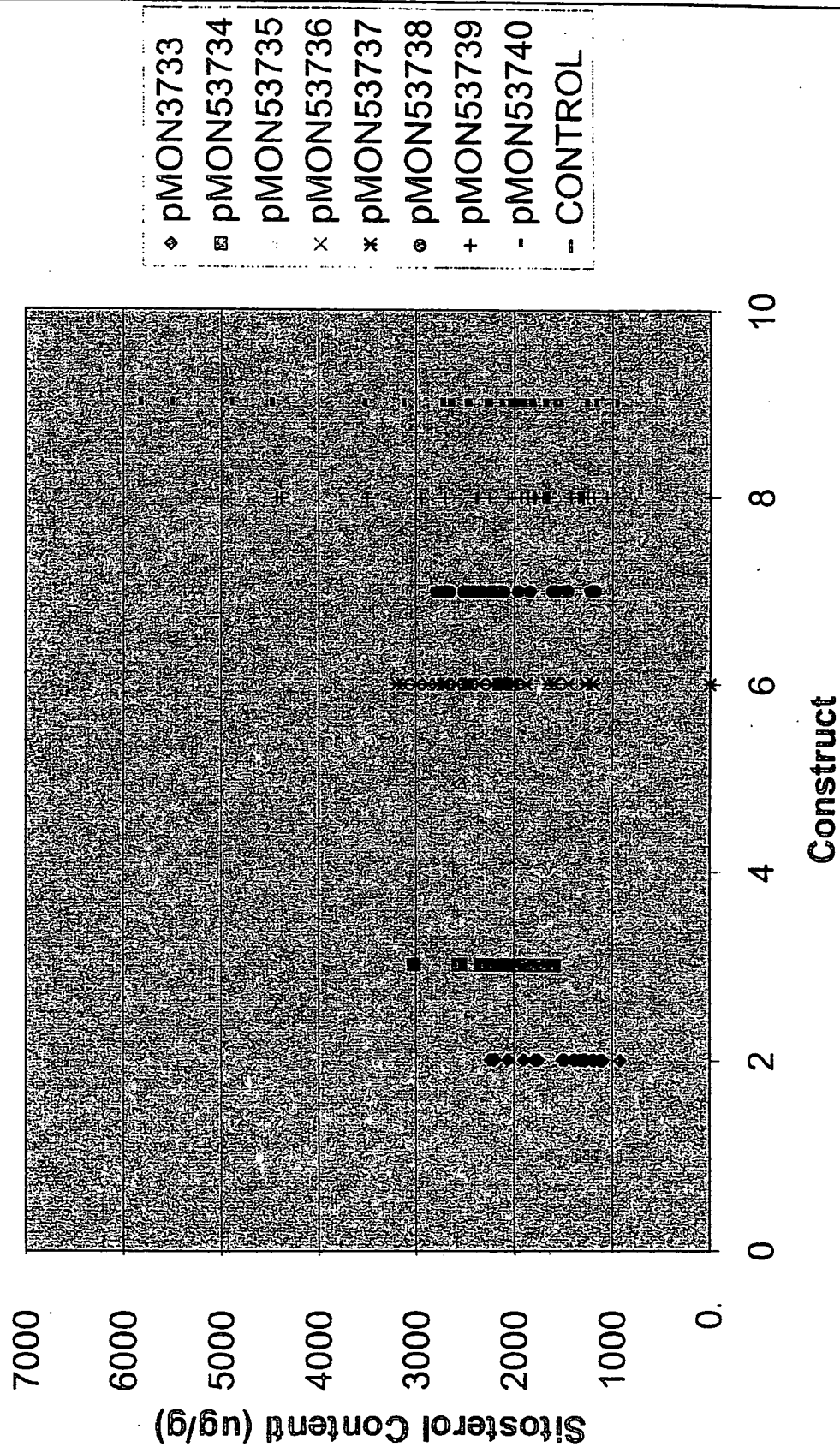
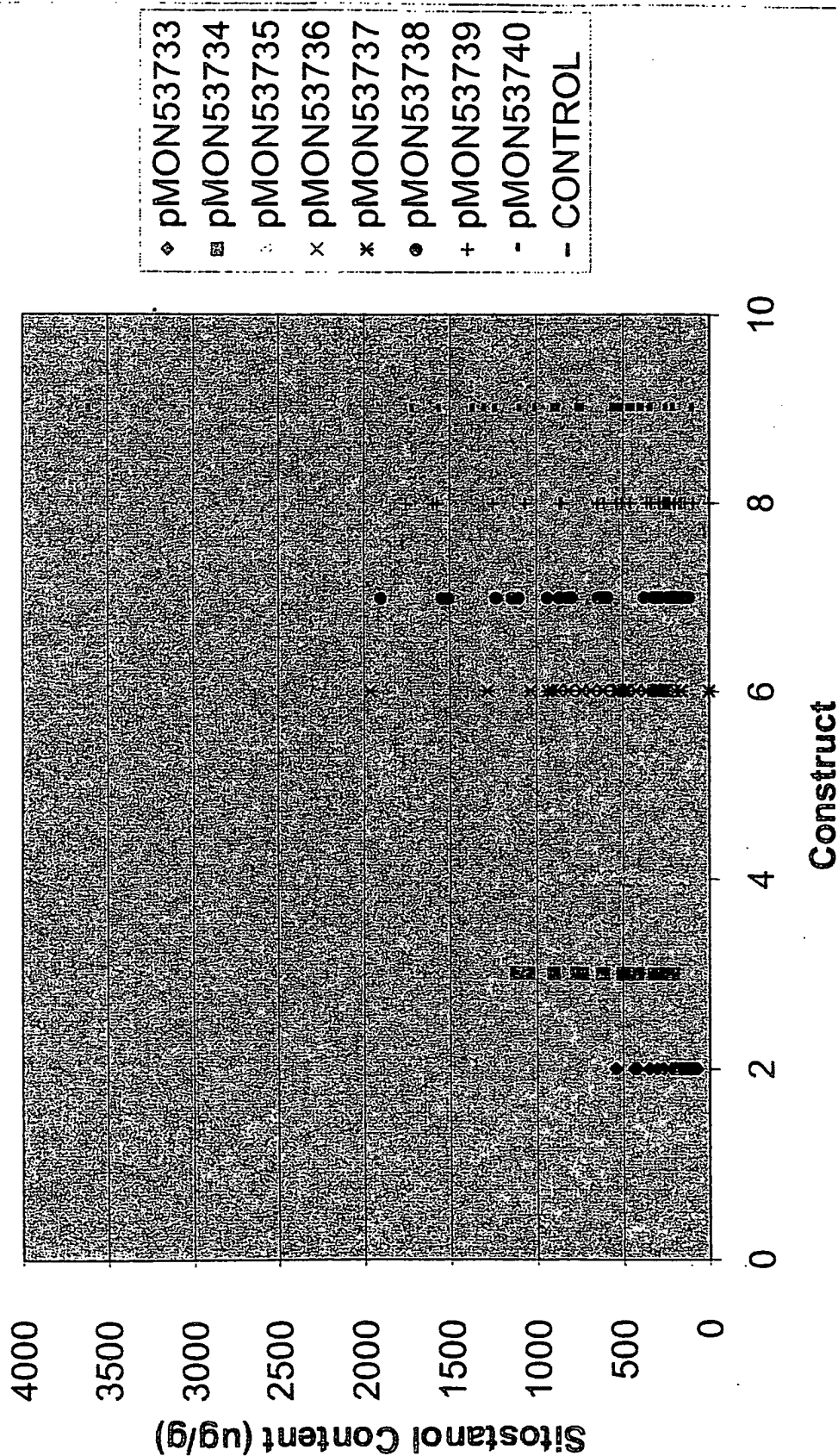


FIGURE 25

Comparison of Sitostanol Levels in Transgenic Plants



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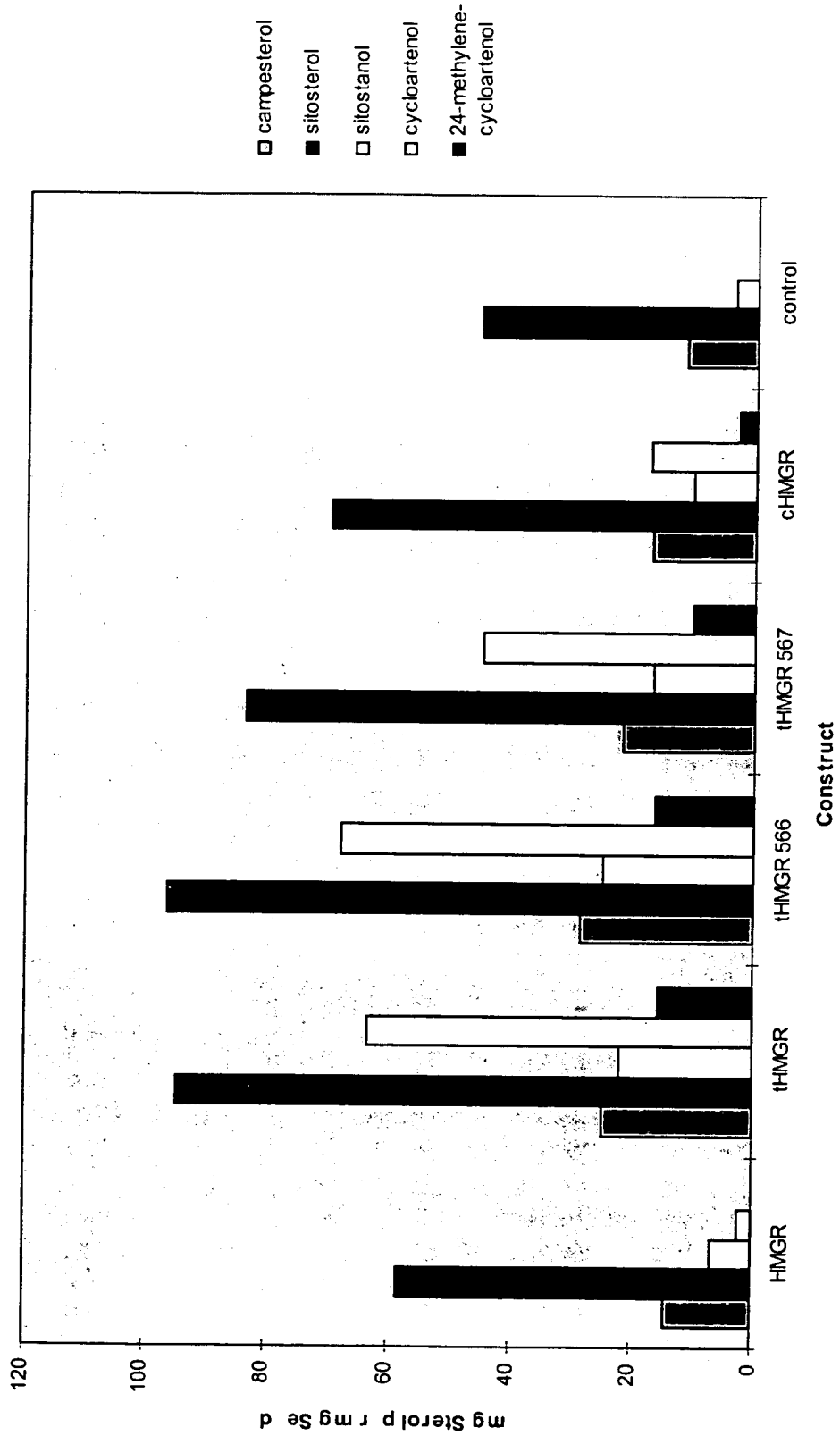


Figure 27: Sterol profile of transgenic *Arabidopsis* harboring different forms of rubber HMGR. HMGR: rubber full length HMGR; tHMGR: catalytic domain of rubber HMGR with the linker region; tHMGR 566: catalytic domain with linker region of rubber HMGR in which the serine residue at 566 is converted to alanine; tHMGR 567: catalytic domain with linker region of rubber HMGR in which the serine residue at 567 is converted to alanine; cHMGR: catalytic domain of rubber HMGR without the linker region.

Plant HMG CoA Reductase in Yeast HMG1 Knockout Mutant

FIGURE 28



■ squalene
■ zymosterol
■ ergosterol



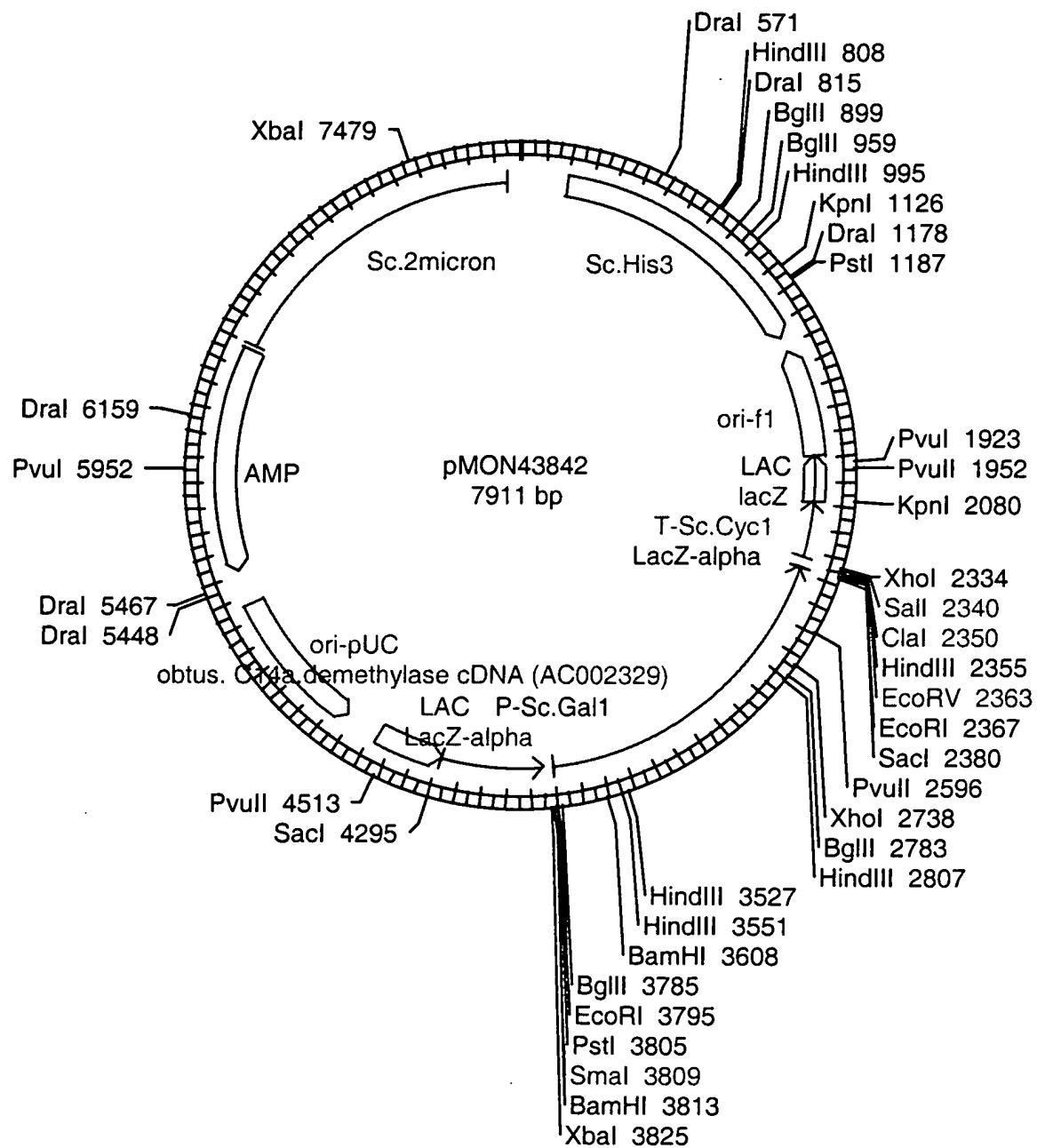


Figure 29: Construct pMON43842

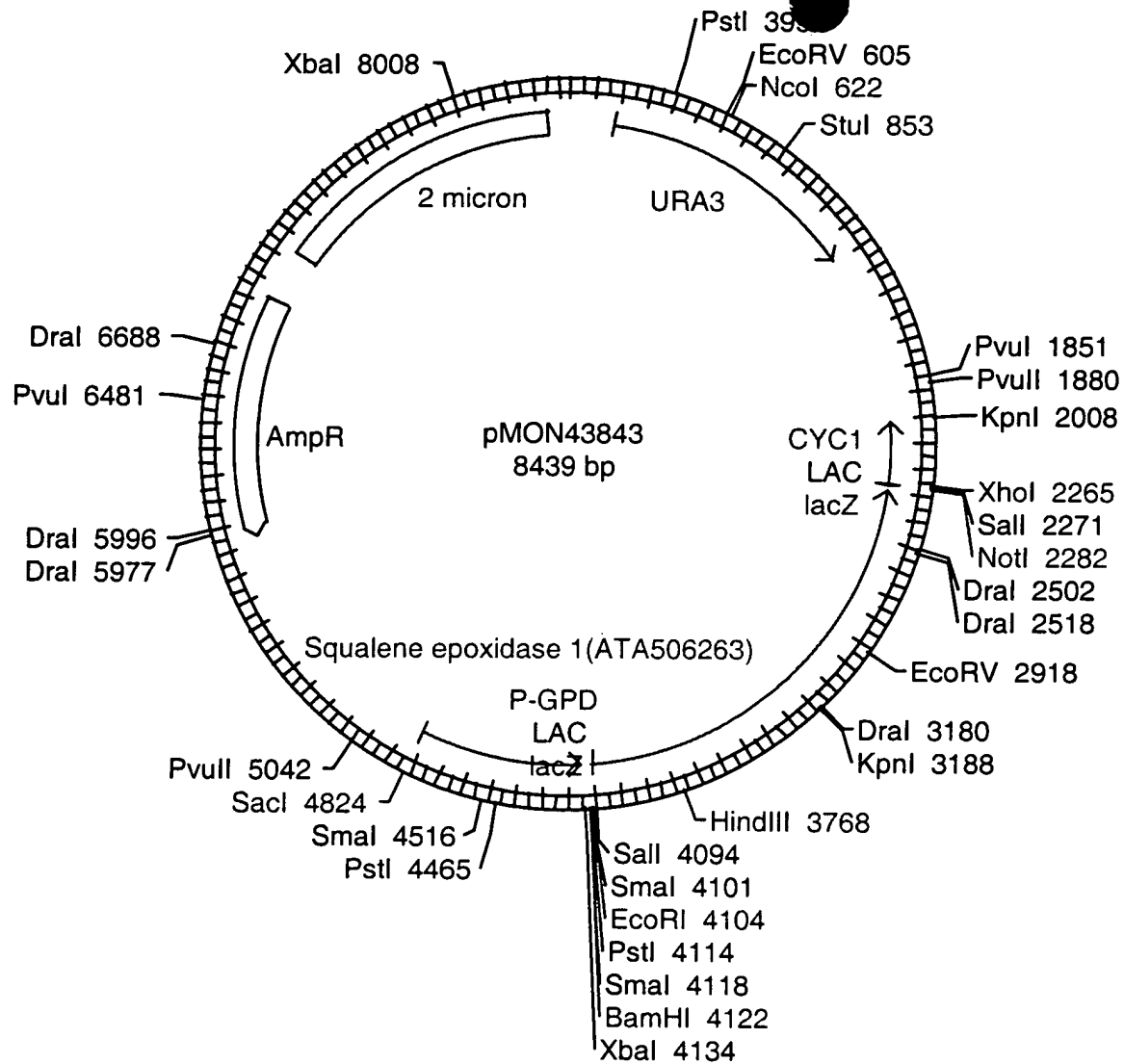


Figure 30: Construct pMON43843

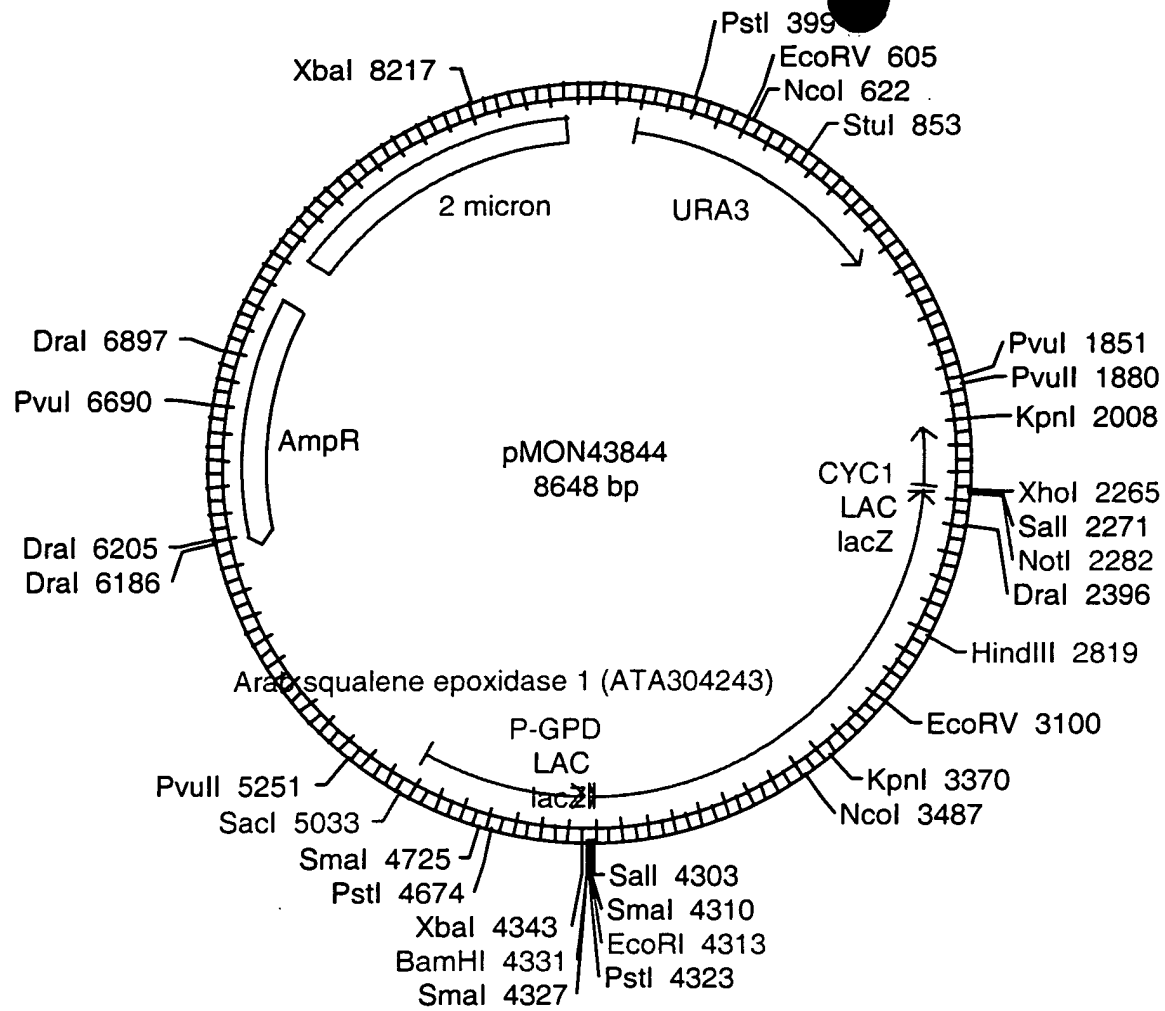


Figure 31: Construct pMON43844

Plurality: 5.00 Threshold: 4 AveWeight 1.00 AveMatch 2.91 AvMismatch -2.00
1

50

```

HMGRclustalW{methanobac} .....
.....
HMGRclustalW{methanococ} .....
.....
HMGRclustalW{halobacter} .....
.....
HMGRclustalW{sulfolobus} .....
.....
HMGRclustalW{      yeast2} MSLPLKTIVH LVKPFACAR FSARYPIHVI VVAVLLSAAA
YLSVTQSYLN
HMGRclustalW{      yeast1} MPPLFKGLKQ MAKPIAYVSR FSAKRPIHII LFSLIISAF
YLSVIQYYFN
HMGRclustalW{phycomyces} .....
.....
HMGRclustalW{  fusarium} .....
.....
HMGRclustalW{  candida} .....
.....
HMGRclustalW{dictyoste2} .....
.....
HMGRclustalW{wheat1} .....
.....
HMGRclustalW{      rice} .....
.....
HMGRclustalW{  corn} .....
.....
HMGRclustalW{wheat3} .....
.....
HMGRclustalW{wheat2} .....
.....
HMGRclustalW{      soybean} .....
.....
HMGRclustalW{rubbertre3} .....
.....
HMGRclustalW{rosyperiwi} .....
.....
HMGRclustalW{      tomato} .....
.....
HMGRclustalW{woodtobacc} .....
.....
HMGRclustalW{      potato} .....
.....
HMGRclustalW{radish} .....
.....
HMGRclustalW{arabadosis1} .....
.....
HMGRclustalW{cucumismel} .....
.....
HMGRclustalW{rubbertre2} .....
.....
HMGRclustalW{rubbertre1} .....
.....
HMGRclustalW{camptothec} .....
.....
HMGRclustalW{arabados2} .....
.....
HMGRclustalW{chineseham} .....
.....

```

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```

HMGRclustalW{chineseha2} .....
.....
HMGRclustalW{syrianhamst} .....
.....
HMGRclustalW{    rat} .....
.....
HMGRclustalW{    rabbit} .....
.....
HMGRclustalW{    human} .....
.....
HMGRclustalW{    mouse} .....
.....
HMGRclustalW{    xenopus} .....
.....
HMGRclustalW{sea urchin} .....
.....
HMGRclustalW{ cockroach} .....
.....
HMGRclustalW{drosophila} .....
.....
HMGRclustalW{dictyostel} .....
.....
HMGRclustalW{schistosom} .....
.....
HMGRclustalW{archaeoglo} .....
.....
HMGRclustalW{pseudomonas} .....
.....
-----
Consensus -----

```

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FIG. 32B

51

100
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} EWKLDN.QY STYLSIKPDE LFEKCTHYR SPVSDTWKLL
 SSKEAADIYT
 HMGRclustalW{ yeast1} GWQLDSNSVF ETAPNKDSNT LFQEC SHYYR DSSLDGWVSI
 TAHEASELPA
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium}MDH EGCQGQHPQQ
 CCQWVSNAWS
 HMGRclustalW{ candida}MFYH GASANQHWIA
 VDDL SKVPVD
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}

 HMGRclustalW{rosyperiwi}

 HMGRclustalW{ tomato}

 HMGRclustalW{woodtobacc}

 HMGRclustalW{ potato}

 HMGRclustalW{radish}

 HMGRclustalW{arabadopsis1}

 HMGRclustalW{cucumismel}

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertre1}

 HMGRclustalW{camptothec}

 HMGRclustalW{arabadops2}

 HMGRclustalW{chineseham}MLSRLFRMH
 GLFVASHPWE
 HMGRclustalW{chineseha2}MLSRLFRMH

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```

GLFVASHPWE
  HMGRclustalW{syrianhamst} ..... .MLSRLFRMH
GLFVASHPWE
  HMGRclustalW{    rat} ..... .MLSRLFRMH
GLFVASHPWE
  HMGRclustalW{    rabbit} ..... .MLSRLFRMH
GLFVASHPWE
  HMGRclustalW{    human} ..... .MLSRLFRMH
GLFVASHPWE
  HMGRclustalW{    mouse} .....
.....
  HMGRclustalW{    xenopus} ..... .MLSRLFRMH
GQFVASHPWE
  HMGRclustalW{sea urchin} ..... .MLSRLFLAQ
GRFCSSHPWE
  HMGRclustalW{ cockroach} ..... .MVGRLFRAH
GQFCASHPWE
  HMGRclustalW{drosophila} ..... .MIGPLFRAT
.QFCASHPWE
  HMGRclustalW{dictyostel} .....
.....
  HMGRclustalW{schistosom} .....
.....
  HMGRclustalW{archaeoglo} .....
.....
  HMGRclustalW{pseudomonas} .....
.....
                                Consensus ----- -MLSRLFRMH
GLFVASHPWE

```

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FIG. 32D

101

150
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} PFHYYLSTIS FQSKDNSTTL PSLDDVIYSV DHTRYLLSEE
 PKIPTLVSE
 HMGRclustalW{ yeast1} PHHYLLNLN FNSPNETDSI PELANTVFEK DNTKYILQED
 LSVSKEISSST
 HMGRclustalW{phycomycetes}

 HMGRclustalW{ fusarium} EFLDLLKNAE TLDIVIMLLG YIAMHLTFVS LFLSMRKMGS
 KFWLGICTLF
 HMGRclustalW{ candida} VDHYNVVPFQ FRRAGEYKEP VLSGIVELDE VKFVVSQSDA
 AEQWQLTAE
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}

 HMGRclustalW{rosyperiwi}

 HMGRclustalW{ tomato}

 HMGRclustalW{woodtobacc}

 HMGRclustalW{ potato}

 HMGRclustalW{radish}

 HMGRclustalW{arabadopsis1}

 HMGRclustalW{cucumismel}

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel}

 HMGRclustalW{camptothec}

 HMGRclustalW{arabadops2}

 HMGRclustalW{chineseham} VIVGTVT..L TICMMSMN.. MFTGNK... ..

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```

HMGRclustalW{chineseha2} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{syrianhamst} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      rat} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      rabbit} VIVGTVT..L TICMMSMN.. MFTGNDK... ..
.....
HMGRclustalW{      human} VIVGTVT..L TICMMSMN.. MFTGNNK... ..
.....
HMGRclustalW{      mouse} .....
.....
HMGRclustalW{      xenopus} VIVGTVT..L TICMMSMN.. MFTGNDK... ..
.....
HMGRclustalW{sea urchin} VIVCTLT..L TICMLSMN.. YFTGLPR... ..
.....
HMGRclustalW{cockroach} VIVATLT..L TVCMLTVDQ. RPLGLP....
.....
HMGRclustalW{drosophila} VIVALLT..I TACMLNGGQE QYPGCEQRIG HSTASAAAAG
SGSGAGSGAS
HMGRclustalW{dictyostel} .....
.....
HMGRclustalW{schistosom} .....
.....
HMGRclustalW{archaeoglo} .....
.....
HMGRclustalW{pseudomonas} .....
.....

Consensus VIVGTVT--L TICMMSMN-- MFTGNNK--- -----

```

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151

200
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} NGTKWRLRNN SNFILDHNI YRNMVKQFSN KTSEFDQFDL
 FIILAAYLTL
 HMGRclustalW{ yeast1} DGTKWRLRSD RKSLFDVKTL AYSLYDVFSE NVTQADPFDV
 LIMVTAYLMM
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} SSVFAFLFGL VVTTKLGVP I SVILLSEGLP FLVVTIGFEK
 NIVLTRA VMS
 HMGRclustalW{ candida} DGT VWR SRAY HGKLGKYS DM AVGAFNKVLN LVRGAETFDI
 ALVT CAYIAM
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}

 HMGRclustalW{rosyperiwi}

 HMGRclustalW{ tomato}

 HMGRclustalW{woodtobacc}

 HMGRclustalW{ potato}

 HMGRclustalW{radish}

 HMGRclustalW{arabadopsis1}

 HMGRclustalW{cucumismel}

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel}

 HMGRclustalW{camptothec}

 HMGRclustalW{arabadops2}

 HMGRclustalW{chineseham}I CGWNYEC.PK FEEDVLSSDI
 IILTITRCIA

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 T00290-025860

39178

```

      HMGRclustalW{chineseha2} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{syrianhamst} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      rat} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      rabbit} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      human} .....I CGWNYEC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{      mouse} .....
.....
      HMGRclustalW{      xenopus} .....I CGWNYAC.PK FEEDVLSSDI
IILTITRCIA
      HMGRclustalW{sea urchin} .....I CGWNYECAPQ VKESSLSSDV
LVMCIMRTLA
      HMGRclustalW{ cockroach} ..... PGWGHNC..I TLEEYNAADM
IVMTLIRCVA
      HMGRclustalW{drosophila} GTIPPSSMGG SATSSRHRPC HGWSQSC.DG LEAEYNAADV
ILMTIVRCTA
      HMGRclustalW{dictyostel} .....
.....
      HMGRclustalW{schistosom} .....M LKILNTVLLF FDCFSTGTFF
VLLIYLFTRL
      HMGRclustalW{archaeoglo} .....
.....
      HMGRclustalW{pseudomonas} .....
.....

Consensus -----I CGWNYEC-PK FEEDVLSSDI
IILTITRCIA

```

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FIG.32 H

201

250
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} FYTLCCLFND MRKIGSKFWL SFSALSNSAC ALYLSLYTTH
 SLLKKPASLL
 HMGRclustalW{ yeast1} FYTIFGLFND MRKTGSNFWL SASTVVNSAS SLFLALYVTQ
 CILGKEVSAL
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} HAIEHRR IQA QNSKSGKRSP DGSTQNMIQY AVQAAIKEKG
 FEIIRDY AIE
 HMGRclustalW{ candida} FYTLFNL FAR MRAVGSKVWL GLSTLVSSFF AFLFALYITT
 RVLDSLIPFL
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}

 HMGRclustalW{rosyperiwi}

 HMGRclustalW{ tomato}

 HMGRclustalW{woodtobacc}

 HMGRclustalW{ potato}

 HMGRclustalW{radish}

 HMGRclustalW{arabadopsis1}

 HMGRclustalW{cucumismel}

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel}

 HMGRclustalW{camptothec}

 HMGRclustalW{arabadops2}

 HMGRclustalW{chineseham} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH

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```

HMGRclustalW{chineseha2}  ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{syrianhamst} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      rat}   ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      rabbit} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      human}  ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{      mouse}  .....
.....
HMGRclustalW{      xenopus} ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH
.....
HMGRclustalW{sea urchin}  VAYLYLQFTK LRTTGSKYIL GIAGLFTIFS SFLFSSAVIH
.....
HMGRclustalW{cockroach}   VLYSYYQFCH LQKLGSKYIL GIAGLFTVFS SFVFSSSVIN
.....
HMGRclustalW{drosophila}  VLYCYYQFCS LHRLGSKYVL GIAGLFTVFS SFIFTTAAIK
.....
HMGRclustalW{dictyostel}  .....
.....
HMGRclustalW{schistosom} RTHLLHFSSS NCHLDVIIYQ SRAVIFLVV FVYFIGVLTC
KINDKILVHT
HMGRclustalW{archaeoglo}  .....
.....
HMGRclustalW{pseudomonas} .....
.....

Consensus  ILYIYFQFQN LRQLGSKYIL GIAGLFTIFS SFVFSTVVIH -----

```

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FIG. 325

251

300
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} SLVIGLPFIV VIIG.FKHKV RLAAFSLQKF HRISIDKKIT
 VSNIIEAMF
 HMGRclustalW{ yeast1} TLFEGLPFIV VVVG.FKHKI KIAQYALEKF ERVGLSKRIT
 TDEIVFESVS
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} IVILVIGAAS GVQGGGLQQFC FLAAWTLF.F DFILLFTFYT
 AILSIKLRST
 HMGRclustalW{ candida} SLSEGIPFFV AVVG.FNNKI LLAEKVLQ.N QLNAQSSKND
 APTVLYQALR
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}M EVRG..... .GVGQGSAAAR
HPPA
 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}M DEVRRRPP.K HIVRKDHDGE
 VLNSFSHG..
 HMGRclustalW{rosyperiwi}M DSRRRSP... TVTAKAAAGE
 LPLAPHEGQ..
 HMGRclustalW{ tomato}M DVRRRSEEPV YPSKVFAADE
 KPLKPHKKQQ
 HMGRclustalW{woodtobacc}M DVRRRSEKPA YPTKEFAAGE
 KPLKPHK..
 HMGRclustalW{ potato}M DVRRRPPVKPL YTSKDASAG.
 EPLKQQE..
 HMGRclustalW{radish}M DIRR..RPPK PPVNSN....
 ...RFLDNRS
 HMGRclustalW{arabadopsis1}M DLRR..RPPK PPVTNNNNNSN
 GSFRSYQPRT
 HMGRclustalW{cucumismel}M DRRRSLRPPR PNAVQDADAT
 CTFRRDEQDA
 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel}M DTTG..RLH.HR....
KHAT
 HMGRclustalW{camptothec}M DVRRRSINSI HQIPSVGGTA
 PPMLKPKQPT
 HMGRclustalW{arabadops2}M EDLRRRFPTK KNGEEISN..

 HMGRclustalW{chineseham} FLDKELTGLN EALPFFLLLI DLSRASALAK FALSSNSQDE
 VRENIARGMA

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HMGRclustalW{chineseha2} FLDKELTGLN EALPFFLLLI DLSRASALAK FALSSNSQDE
 VRENIARGMA
 HMGRclustalW{syrianhamst} FLDKELTGLN EALPFFLLLI DLSRASALAK FALSSNSQDE
 VRENIARGMA
 HMGRclustalW{ rat} FLDKELTGLN EALPFFLLLI DLSRASALAK FALSSNSQDE
 VRENIARGMA
 HMGRclustalW{ rabbit} FLDKELTGLN EALPFFLLLI DLSRASALAK FALSSNSQDE
 VRENIARGMA
 HMGRclustalW{ human} FLDKELTGLN EALPFFLLLI DLSRASTLAK FALSSNSQDE
 VRENIARGMA
 HMGRclustalW{ mouse}

 HMGRclustalW{ xenopus} FLDKELTGLN EALPFFLLLI DLSKASALAK FALSSNSQDE
 VRDNIARGMA
 HMGRclustalW{sea urchin} LFGLELTGLN EALPFFLLLI DLTkasaltk FALSSTTQNE
 VVDNIARGMA
 HMGRclustalW{ cockroach} FLGSDVSDLK DALFFFLLLI DLSKATVLAQ FALSSRSQDE
 VKHNIARGIA
 HMGRclustalW{drosophila} FLGSDISELK DALFFLLLVI DLSNSGRLRS GAMGSN.QAE
 VTQNIARGLE
 HMGRclustalW{dictyostel}

 HMGRclustalW{schistosom} MLRNKRQLNT LFYTLILFTF ALCSLSSVLF VPYTSFAIFL
 LSTSVFLLFS
 HMGRclustalW{archaeoglo}

 HMGRclustalW{pseudomonas}

 Consensus FLDKELTGLN EALPFFLLL- DL-RASALAK FALSSNSQDE
 VRENIARGMA

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FIG. 32L

301

350
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} QEGAYLIRDY LFYISSFIGC AIYARHLPGL VNFCILSTFM
 LVFDLLLSAT
 HMGRclustalW{ yeast1} EEGGRLIQDH LLCIFAFIGC SMYAHQLKTL TNFCILSAFI
 LIFELILTPT
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} VSSVMSICVW PLRMMASRRV AENVAKGDDE LNRVRGDAPL
 FGRKSSSIPK
 HMGRclustalW{ candida} EQGPLLLRDH LFMITAFLGC SFYASYLDGL KNFCILAALI
 LAFDILTST
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}MRIT.....
 ...NGLAMVS
 HMGRclustalW{ corn} PE....PSRAAA RVQAGDALPL PIRHT.....
 ...NLIFSAL
 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}HH L.....PP LKPSDYSLPL SLYLA.....
 ...NALVFSL
 HMGRclustalW{rosyperiwi}NQ Q.....PS IPRSSDVLPL PLYLA.....
 ...NGVFFTL
 HMGRclustalW{ tomato} QQ....QEDK N.....TL LIDASDALPL PLYLTT....
 ...NGLFFTM
 HMGRclustalW{woodtobacc} QQ....QEOD N.....SL LI.ASDALPL PLYLT.....
 ...NGLFFTM
 HMGRclustalW{ potato}VS SPKASDALPL PLYLT.....
 ...NGLFFTM
 HMGRclustalW{radish} DD....DDRR K.....TLTS PPKASDALPL PLYLT.....
 ...NAVFFTL
 HMGRclustalW{arabadopsis1} SD....DDHR RR..ATTIAP PPKASDALPL PLYLT.....
 ...NAVFFTL
 HMGRclustalW{cucumismel} SA....ADHL KR.....A SPKASDALPL PLYLT.....
 ...NTIFFTL
 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertre1} PV....EDRS P.....T TPKASDALPL PLYLT.....
 ...NAVFFTL
 HMGRclustalW{camptothec} KV....DAVD L.....PD SPKASDALPL PLYIT.....
 ...NGVFFTL
 HMGRclustalW{arabadops2}VAVDPP LRKASDALPL PLYLT.....
 ...NTFFLSL
 HMGRclustalW{chineseham} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFM

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HMGRclustalW{chineseha2} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFMT
 HMGRclustalW{syrianhamst} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFMT
 HMGRclustalW{ rat} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFMT
 HMGRclustalW{ rabbit} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFMT
 HMGRclustalW{ human} ILGPTFTLDA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFVFMT
 HMGRclustalW{ mouse}

 HMGRclustalW{ xenopus} ILGPTFTLEA LV..ECLVIG VGTMSGVRQL EIMCCFGCMS
 VLANYFAFMT
 HMGRclustalW{sea urchin} ILGPTITLDT VV..TTLVIS IGTMS SIRM EVFCCFGILS
 LIANYFVFMT
 HMGRclustalW{ cockroach} MLGPTITLDT VV..ETLVIG VGMLSGVRRL EVLCCFACMS
 VIVNYVVFMT
 HMGRclustalW{drosophila} LLGPAISLDT IV..VLLVG VGTLSGVQRL EVLCMFAVLS
 VLVNYVVFMT
 HMGRclustalW{dictyostel}M LFAPPNLETK ELFWIIY.IL
 ILIPKVFAKV
 HMGRclustalW{schistosom} DLSVFFIVLE YYLLEIELVN YEHA KRHCLL SHLFSNQLFV
 DHMLGMFLKT
 HMGRclustalW{archaeoglo}

 HMGRclustalW{pseudomonas}

 Consensus ILGPTFTLDA LV--ECLVIG VGTASD-LPL -LYCTFGCMS
 VLANYFFFMT

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FIG. 32N

400
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} FYSAILSMKL EINIIHRSTV IRQTL..EED GVVPTTADII
 YKDETASEPH
 HMGRclustalW{ yeast1} FYSAILALRL EMNVIHRSTI IKQTL..EED GVVPTSTARI
 SKAEKKS SVSS
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} FKVLMILGFI FVNIVNICSI PFRNP..SSM STIRTWASSL
 GGVIAPLSVD
 HMGRclustalW{ .candida} FLSAILSLKL EINQIHRSTL LREQL..EDD GLTETTVDDV
 LKSNSLAGTK
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice} LVLSSCDLVR LCSDRER... PL..... .GGREFA
 TVVCQLASVV
 HMGRclustalW{ corn} FAASLAYLMR RWREKIRSST PLHA..... .VGLAEML
 AIFGLVASLI
 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3} FFSVAYFLLH RWREKIRKST PLHI..... .VTFPEIA
 ALICLIVASVI
 HMGRclustalW{rosyperiwi} FFSVMYFLLT RWREKIRNAT PLHV..... .VTLSELA
 ALASLIASVI
 HMGRclustalW{ tomato} FFSVMYFLLS RWREKIRNST PLHV..... .VTLSELG
 AIVSLIASVI
 HMGRclustalW{woodtobacc} FFSVMYLLS RWREKIRNST PLHV..... .VTFSELV
 AIASLIASVI
 HMGRclustalW{ potato} FFSVMYFLLV RWREKIRNSI PLHV..... .VTLSELL
 AMVSLIASVI
 HMGRclustalW{radish} FFSVAYYLLH RWRDKIRYNT PLHV..... .VTVTELG
 AIVALIASFI
 HMGRclustalW{arabadopsis1} FFSVAYYLLH RWRDKIRYNT PLHV..... .VTITELG
 AIIALIASFI
 HMGRclustalW{cucumismel} FFSVAYYLLH RWRDKIRNST PLHV..... .VTLSEIA
 AIVSLMASFI
 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertre1} FFSVAYYLLH RWRDKIRNST PLHI..... .VTLSEIV
 AIVSLIASFI
 HMGRclustalW{camptothec} FFTVYYLLV RWREKIRNST PLHV..... .VTLSEIA
 AIFTFVASFI
 HMGRclustalW{arabadops2} FFATVYFLLS RWREKIRNST PLHV..... .VDLSEIC
 ALIGFVASFI
 HMGRclustalW{chineseham} FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEE.
 NKPNPVTQRV

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HMGRclustalW{chineseha2}	FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.
NKPNPVTQRV	
HMGRclustalW{syrianhamst}	FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.
NKPNPVTQRV	
HMGRclustalW{ rat}	FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.
NKPNPVTQRV	
HMGRclustalW{ rabbit}	FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.
NKPNPVTQRV	
HMGRclustalW{ human}	FFPACVSLVL ELSRESREGR PIWQ...LSH FARVLEEEEE.
NKPNPVTQRV	
HMGRclustalW{ mouse}	.....
.....	
HMGRclustalW{ xenopus}	FFPACVSLVL ELSRESREGR PIWQ...LSQ FASVLEEEED
NKPNPVTQRV	
HMGRclustalW{sea urchin}	FFPACLSLVL ELSNSNKYGR PVWH...LGR FAEVLEEEED
RKPNPVVQRV	
HMGRclustalW{ cockroach}	FYPACLSLIL ELSRSGESGR PAWHD..KSL IIKALHEED.
QKPNPVVQRV	
HMGRclustalW{drosophila}	FYPACLSLIF DLSRSGVDMS VVREKAKGSL PLKSLTEEE.
QKANPVLQRV	
HMGRclustalW{dictyostel}	MSVRELFPPF KWGFNIRRSN FLVP..... ...ILSNNVI
VTGEEAVQYE	
HMGRclustalW{schistosom}	SLFSISTTSK YAYLESIFKC TLMEQIIYIM IVFVFLPSFM
RIFASYAKRM	
HMGRclustalW{archaeoglo}	.....
.....	
HMGRclustalW{pseudomonas}
.....	
Consensus	FFSACYLLLL -WRRKIRNST PLHV---LSH FARVTLEEEA AKPN-
VASRI	

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FIG. 32P

401

450
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} FLRSNVAIL GKASVIGLLL LINLYVF... .TDKLNATIL
 NTVYFDSTIY
 HMGRclustalW{ yeast1} FLNLSVVVII MKLSVILLFV FINFYNF... GANWVN.DAF
 NSLYFDKERV
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} PFKVASNGLD AILPTAKSNN RPTLVTV... LTPIKYELEY
 PSIHVALGSA
 HMGRclustalW{ candida} TFTDAPSTLV TVAKVAGVSV FFGLHIFY... GFSGAWLSDL
 SAGNETNDTF
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice} YLLSLFAHPD APATTTGDDD

 HMGRclustalW{ corn} YLLSFFGIAF VQSIVSSGDD

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3} YLLGFFGIGF VHSFS.RAST

 HMGRclustalW{rosyperiwi} YLVSFFGLDF VQSLIYKPNN

 HMGRclustalW{ tomato} YLLGFFGIGF VQTFVSRGNN

 HMGRclustalW{woodtobacc} YLLGFFGIGF VQSFVSRDNN

 HMGRclustalW{ potato} YLLGFFGIGF VQSFVSRSNS

 HMGRclustalW{radish} YLLGFFGIDF VQSFISRP..

 HMGRclustalW{arabadopsis1} YLLGFFGIDF VQSFISRASG

 HMGRclustalW{cucumismel} YLLGFFGIDF VQSFARSSP

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel} YLLGFFGIDF VQSFARASH

 HMGRclustalW{camptothec} YLLGFFGIGL VQPFTSRSSH

 HMGRclustalW{arabadops2} YLLGFCGIDL IFRSS..SD.

 HMGRclustalW{chineseham} KMIMSLGLVL VHAHSRWIAD PSPQNST... TE.HSKVSLG
 LDEDVSKRIE

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HMGRclustalW{chineseha2}	KMIMSLGLVL	VHAHSRWIAD	PSPQNST...	TE.HSKVSLG
LDEDVSKRIE				
HMGRclustalW{syrianhamst}	KMIMSLGLVL	VHAHSRWIAD	PSPQNST...	TE.HSKVSLG
LDEDVSKRIE				
HMGRclustalW{rat}	KMIMSLGLVL	VHAHSRWIAD	PSPQNST...	AE.QSKVSLG
LAEDVSKRIE				
HMGRclustalW{rabbit}	KMIMSLGLVL	VHAHSRWIAD	PSPQNST...	AD.NSKVSLG
LDENVSKRIE				
HMGRclustalW{human}	KMIMSLGLVL	VHAHSRWIAD	PSPQNST...	AD.TSKVSLG
LDENVSKRIE				
HMGRclustalW{mouse}	.....	.....	.....	.....
.....				
HMGRclustalW{xenopus}	KMIMSLGLVL	VHAHSRWIAD	PSSQNST...	SISDHEVTTM
LDDMMPKRVE				
HMGRclustalW{sea urchin}	KMIMRTGLVL	VHAHSRWLAS	....NDT...	ELMSRDMLYD
GNNLTDDKID				
HMGRclustalW{cockroach}	KVIMSAGLML	VHAH.RWVRC	.....	.....L.
.....				
HMGRclustalW{drosophila}	KLIMTTGLMA	VHIYSREVSP	....AAT...	TMVDKTLTPT
LSLNVSNNRT				
HMGRclustalW{dictyostel}	KPLPYIPQHN	QQQQQKQPS	.....	.....
.....				
HMGRclustalW{schistosom}	YGEQKKCLVS	NKGVSSSTRK	RRHSYSSGHS	YVEYRRMSVH
NLIGYVVNPN				
HMGRclustalW{archaeoglo}	.....	.....	.....	.....
.....				
HMGRclustalW{pseudomonas}
.....				
	Consensus	YLL-FFG-VL	V-A-SR-ISK	PSPQNST--- ----SKVSLG LDE-
VSKRIE				

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FIG. 32R

451

500
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} SLPNFINYKD IGNLSNQVII SVLPKQYYTP LKKYHQIEDS
 VLLIIDSVS
 HMGRclustalW{ yeast1} SLPDFITSNA SENFKEQAIV SVTPLLYYKP IKSYQRIEDM
 VLLLLLRNVSV
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} ASNPAYN.DA FHHHFQGYGV GGRMVGGILK SLEDPVLSKW
 IVIALALSA
 HMGRclustalW{ candida} TLYDAVA.DQ IPIGSNGTLV TLFPTRFLLP EKLSTQIEAV
 VLSFIGLIST
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice} ..D.....

 HMGRclustalW{ corn} ..DEDFLVGS G.....

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3} ..D.SWDVEE Y.....D DDNIIKEDT
 R.....
 HMGRclustalW{rosyperiwi} ..E.GWEIEEEILMVEDS
 RN.....
 HMGRclustalW{ tomato} ..D.SWDE..N DEEFLLKEDS
 RC.....
 HMGRclustalW{woodtobacc} ..DECWDEED E.....N DEQFLLEEDS
 RR.....
 HMGRclustalW{ potato} ..D.SWDIED E.....N AEQLIIEEDS
 RR.....
 HMGRclustalW{radish} ..D.SGDSERDFDDH
 R.....
 HMGRclustalW{arabadopsis1} ..D.AWDLAD T.....IDDDDH
 R.....
 HMGRclustalW{cucumismel} ..D.AWLEDEIDRT
 L.....
 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertre1} ..D.VWDLED T.....D P.NYLIDEDH
 R.....
 HMGRclustalW{camptothec} ..DDVWGVDD DE.....D VDEIVLKEDT
 R.....
 HMGRclustalW{arabadops2} ..DDVWVNDG

 HMGRclustalW{chineseham} PSVSLWQFYL SKMISMDIEQ VVTLSLAFLL AVKYIFFEQA
 ET..ESTLSL

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HMGRclustalW{chineseha2}	PSVSLWQFYL SKMISMDIEQ VVTLSLAFL	AVKYIFFEQA
ET..ESTLSL		
HMGRclustalW{syrianhamst}	PSVSLWQFYL SKMISMDIEQ VVTLSLAFL	AVKYIFFEQA
ET..ESTLSL		
HMGRclustalW{ rat}	PSVSLWQFYL SKMISMDIEQ VITLSLALL	AVKYIFFEQA
ET..ESTLSL		
HMGRclustalW{ rabbit}	PSVSLWQFYL SKMISMDIEQ VITLSLALL	AVKYIFFEQA
ET..ESTLSL		
HMGRclustalW{ human}	PSVSLWQFYL SKMISMDIEQ VITLSLALL	AVKYIFFEQT
ET..ESTLSL		
HMGRclustalW{ mouse}	.....	.....
.....		
HMGRclustalW{ xenopus}	PSMPLWQFYL SRMVTMDVEQ IITLGLALL	AVKYIFFEQT
ET..ESTFSM		
HMGRclustalW{sea urchin}	PTMPLWEFYA TRLWPPTLDY ILTAILATVL	ASHYIFFSDL
ATYPEKRVSI		
HMGRclustalW{ cockroach}	.SIALWPDLT S.....LRY FCTHCDTGVS	YSRWSFASEG
EE..LPTVKL		
HMGRclustalW{drosophila}	ESGEIADIII KWL.TMSADH IVISIVLIAL	VVKFICFDNR
DP...LPDQL		
HMGRclustalW{dictyostel}	..QDYIQQPQ .....	..N....DNN
IN.....		
HMGRclustalW{schistosom}	CHYKCWSTTF VIFVSLIILH LNNRYSERIS	SFKHNSSENE
VFPVLYHITA		
HMGRclustalW{archaeoglo}	.....	.....
.....		
HMGRclustalW{pseudomonas}
.....		
Consensus	PSDSLWDFY- SKMISMDIEQ VVTLSLA-LL	AVKYIFFED- RT--
ESTLSL		

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501

550

HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2} AIRDQFISKL LFFAFAVIS INVYLLNAAK IHTGYMNFQ.
 ..PQSNKIDD
 HMGRclustalW{ yeast1} AIRDRFVSKL VLSALVCSAV INVYLLNAAR IHTSYTADQL
 VKTEVTKKSF
 HMGRclustalW{phycomycetes}

 HMGRclustalW{ fusarium} LNGYLFNVAR WGIKDPNVPE HNIDRNELAR AREFNDTGS.
AT
 HMGRclustalW{ .candida} AARDKYISKF ILFAFAVSAS INVYLLNVAR IHTTRLEDA.
IE
 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}

 HMGRclustalW{ corn}

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3}

 HMGRclustalW{rosyperiwi}G.....

 HMGRclustalW{ tomato}G.....

 HMGRclustalW{woodtobacc}G.....

 HMGRclustalW{ potato}G.....

 HMGRclustalW{radish}

 HMGRclustalW{arabadopsis1}

 HMGRclustalW{cucumismel}

 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel}

 HMGRclustalW{camptothec}

 HMGRclustalW{arabadops2}

 HMGRclustalW{chineseham} KN..PITSPV VTPKKAPDNC CRREPLLVRR SEKLSSVEEE
 PGVSQDRKVE

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HMGRclustalW{chinese2}	KN..PITSPV	VTPKKAPDNC	CRREPLLVR	SEKLSSVEEE
PGVSQDRKVE				
HMGRclustalW{syrianhamst}	KN..PITSPV	ATPKKAPDNC	CRREPVLRR	NEKLSSVEEE
PGVNQDRKVE				
HMGRclustalW{rat}	KN..PITSPV	VTPKKAQDNC	CRREPLLVR	NQKLSSVEED
PGVNQDRKVE				
HMGRclustalW{rabbit}	KN..PITSPV	VTQKKVPDSC	CRREPVVVR	NQKFCSVEEE
AGMSQDRKVE				
HMGRclustalW{human}	KN..PITSPV	VTQKKVPDNC	CRREPMVR	NQKCDSEEE
TGINRERKVE				
HMGRclustalW{mouse}	.....	.....	.....	.....
.....				
HMGRclustalW{xenopus}	KN..PIISPV	AVQKKQIESC	CRREPEQ.EK	TVHVSSTEEA
S..SKEETEA				
HMGRclustalW{sea urchin}	MEGHEVVNPG	SDHEDASEVE	TIGTLSSSPS	TSDVRVIESM
TSRTQACQTD				
HMGRclustalW{cockroach}	VTGDSVVNSN	STDDAQLHYY	IMRWLTV..S	ADHIVILILL
LALAVKFVFF				
HMGRclustalW{drosophila}	RQ....SGPV	AIEAKASQTT	PIDEEHVE..	.....QEKD
TENSAVRTL				
HMGRclustalW{dictyostel}	.....	.....	.....	.....
.....				
HMGRclustalW{schistosom}	YEVTSIFHFI	YNIFHVINAN	LVVYLFLGLF	LFKRIRLNKP
INSQLRNLNI				
HMGRclustalW{archaeoglo}	.....	.....	.....	.....
.....				
HMGRclustalW{pseudomonas}
.....				
Consensus	KN--PITSPV	VT-KKAPDNC	CRREPLLVR	--K-SSVEEE -G-
SQDRKVE				

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FIG. 32V

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```

600
  HMGRclustalW{methanobac} .....
  .....
  HMGRclustalW{methanococ} .....
  .....
  HMGRclustalW{halobacter} .....
  .....
  HMGRclustalW{sulfolobus} .....
  .....
  HMGRclustalW{      yeast2} LVVQQKSATI EFSET..... ..RSMPTA SSGLETPVTA
KDIISSEIQQ
  HMGRclustalW{      yeast1} TAPVQKASTP VLTN..... ..KTVIS GSKVKSLSSA
QSSSSGPSSS
  HMGRclustalW{phycomyces} .....
  .....
  HMGRclustalW{   fusarium} LPLGEYVPPT PMRTQ..... ..PSTPA ITDDEAEG..
..LHMTKARP
  HMGRclustalW{   candida} LKKPKKKKASK TAVSV..... ..PKAVV VKDSETTKSS
EILHSSSESE
  HMGRclustalW{dictyoste2} ..KGKSVNVE DLKDQ..... ..EIIAL VDKGEIQP..
...HNLETRL
  HMGRclustalW{wheat1} .....
  .....
  HMGRclustalW{      rice} .....GQG GSR..... ..RA.....A
PPEPAPMHGH
  HMGRclustalW{   corn} .....SSGS AAA..... ..PSRQHAQA
PAPCELLGSP
  HMGRclustalW{wheat3} .....
  .....
  HMGRclustalW{wheat2} .....
  .....
  HMGRclustalW{   soybean} .....
  .....
  HMGRclustalW{rubbertre3} .....PTG AC..... ..AAPSLDCS
LSLPTKIHAP
  HMGRclustalW{rosyperiwi} ..T..NCTTL GC..... ..AVPPPSVP
KIAPVVPQQP
  HMGRclustalW{   tomato} ..P...ATTL GC..... ..AVPAPPAR
QIAPMAPPQP
  HMGRclustalW{woodtobacc} ..P...ATTL GCT..... ..AVPPPPAL
QIVPMVPPQP
  HMGRclustalW{   potato} ..PCAAATTL GC..... ..VVPPPPVR
KIAPMVPPQP
  HMGRclustalW{radish} .....LVTC PPP..... ..PPP....S
QIVAAKLPNP
  HMGRclustalW{arabadopsis1} .....LVTC SPP..... ..TP.....
IVSVAKLPNP
  HMGRclustalW{cucumismel} .....LIDN NRY..... ..AAPRSASA
VALPSKVVD
  HMGRclustalW{rubbertre2} .....
  .....
  HMGRclustalW{rubbertrel} .....LVTC PPA..... ..NISTKTTI
IAAPTCLPTS
  HMGRclustalW{camptothec} .....TVP CAA..... ..APVDCPLP
PIKPKVVDPV
  HMGRclustalW{arabadops2} .....MIPC NQ..... ..SLDCREVL
PIKPNSVDPP
  HMGRclustalW{chineseham} VIKPLVVETE SAS..... ..RATFVLG.A .SGTSPPVAA
RTQELEIELP

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HMGRclustalW{chineseha2}	VIKPLVVETE SAS.....	.RATFVLG.A	.SGTSPPVAA
RTQELEIELP			
HMGRclustalW{syrianhamst}	VIKPLVAETE STS.....	.RATFVLG.A	.SGGCSPVAL
GTQEPEIELP			
HMGRclustalW{ rat}	VIKPLVAEAE TSG.....	.RATFVLG.A	.SAASPPLAL
GAQEPGIELP			
HMGRclustalW{ rabbit}	VIKPLVAETD SPH.....	.RAAFVVGGS	.SFPDTSVL
ETKEPEIELP			
HMGRclustalW{ human}	VIKPLVAETD TPN.....	.RATFVVGNS	.SLLDTSVL
VTQEPEIELP			
HMGRclustalW{ mouse}	.....	
.....			
HMGRclustalW{ xenopus}	VIKPLPLETS P.....	.KAKFIVG..	.DSSPLELSP
EDKNTMFDLP			
HMGRclustalW{sea urchin}	PVTASPRNSR SSSPVSSHV	KPARFTIGSS	GSSEDEEEE
VIKEEEVEWV			
HMGRclustalW{ cockroach}	ETRDELTTTR GMDG.....	W VEVSSPVEHK	YVQTEQPSCS
APEQPLEEPP			
HMGRclustalW{drosophila}	LFTIEDQSSA N.....		..ASTQTDLL
PLRHRLVGPI			
HMGRclustalW{dictyostel}	.....SGKEQ EQ.....		..QQQQQQQQ
QQTPDITNQP			
HMGRclustalW{schistosom}	PKIKETLISD QVKQSPVLPK	FSKKLNDIPL	QSRKRIYCLH
KDDDYIDRND			
HMGRclustalW{archaeoglo}	.....	
.....			
HMGRclustalW{pseudomonas}		
.....			
	Consensus	VIKPLVAETE --S-----	-RATFV-G-A -SA-PPPPA- -I-
PPEIELP			

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FIG. 32X

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650
  HMGRclustalW{methanobac} .....MS.
...IMDDLME
  HMGRclustalW{methanococ} .....MEN
YNDILEKMLN
  HMGRclustalW{halobacter} .....MTD
AASLADRVRE
  HMGRclustalW{sulfolobus} .....MK.
IDEVVEKLVK
  HMGRclustalW{      yeast2} NNE.CVYALS SQDEPIRP.L SNLVELME.. ..KEQLKNMN
NTEVSNLVVN
  HMGRclustalW{      yeast1} SEEDDSRDIE SLDKKIRP.L EELEALLS.. ..SGNTKQLK
NKEVAALVIH
  HMGRclustalW{phycomyces} .....
.....
  HMGRclustalW{  fusarium} ANL..... ..PNRS.N EELEKLLS.. ..ENALREMT
DEEVISLSMR
  HMGRclustalW{  .candida} SEQ..... ..SSRP.L EQVIELYK.. ..DGKVKTLV
DDEVVSLVTA
  HMGRclustalW{dictyoste2} PNN..... ..F QRAVHIRR.. ..KLLARDLQ
KEHQRALHAQ
  HMGRclustalW{wheat1} .....
.....
  HMGRclustalW{      rice} G..... ..GGMMEGD
DEEIVAAVAS
  HMGRclustalW{  corn} AA..... ..A.. ..PEKMPED
DEEIVASVVA
  HMGRclustalW{wheat3} .....
.....
  HMGRclustalW{wheat2} .....
.....
HMGRclustalW{      soybean} .....
.....
  HMGRclustalW{rubbertre3} .....I VSTTT..... ..TSTLSDD
DEQIIKSVVS
  HMGRclustalW{rosyperiwi} SK..... ..MV.I IEKPAPLI.. ..TPQNSEE
DEDIIKAVVA
  HMGRclustalW{      tomato} S..... ..MS.M VEKPAPLI.. ..TSASSGE
DEEIIKSVVQ
  HMGRclustalW{woodtobacc} SKV..... ..AA.M SEKPAPLV.. ..TPAASEE
DEEIIKSVVQ
  HMGRclustalW{      potato} AKV..... ..ALS.Q TEKPSPII.. ..MPALSED
DEEIIQSVVQ
  HMGRclustalW{radish} E..... ..QPPLPKE
DEEIVKSULD
HMGRclustalW{arabadosis1} EP..... ..IV.. ..TESLPEE
DEEIVKSVID
  HMGRclustalW{cucumismel} EA..... ..LN.. ..TIPLPEE
DEEVVKMVVD
  HMGRclustalW{rubbertre2} .....
.....
  HMGRclustalW{rubbertre1} EP..... ..LI.. ..APLVSEE
DEMIVNSVVD
  HMGRclustalW{camptothec} P..... ..I.. ..SPPSSEE
DEEIIKSVVE
  HMGRclustalW{arabados2} RE..... ..SELDSVE
DEEIVKLVID
  HMGRclustalW{chineseham} SE..... ..PRP.N EECLQILE.. SAEKGAKFLS
DAEIIQLVNA

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FIG. 32Y

SECRET

DEE I I K L V V A

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```

HMGRclustalW{methanobac} GR..IKLYEI E.RHVPVDEA VRIRREFIE. ....RTCGVK
..LEHVSNY
HMGRclustalW{methanococ} GE..IKPYQL D.KMFGSKIA TEIRRKFIE. ....KKVGIE
..FKHICNYS
HMGRclustalW{halobacter} GD..LRLHEL E.AHADADTA AEARRLLVE. ....SQSGAS
..LDAVGNYG
HMGRclustalW{sulfolobus} GE..ISFHEV D.NLLEANAA MVARRLALE. ....KIVGVG
..LPSIGSTV
HMGRclustalW{      yeast2} G..KLPLYSL EKKLED'TTRA VLVRRKALST LAESPILVS.
...EKLPPFN
HMGRclustalW{      yeast1} G..KLPLYAL EKKLGDTTRA VAVRRKALSI LAEAPVLAS.
...DRLPYKN
HMGRclustalW{phycomycs} .....
.....
HMGRclustalW{      fusarium} G..KIPGYAL EKTLDGDFTRA VKIRRSIIAR NKAADITHS
LDRSKLPYEN
HMGRclustalW{      candida} G..KLPLYAL EKQLGDNLRA VAIRRKALSD LADAPVLRS.
...NKLPYLH
HMGRclustalW{dictyoste2} A..VVAAAEK AATSGEDPSS IQPVVPPTSN LDFEGSLTN.
.....LPVDH
HMGRclustalW{wheat1} .....
.....
HMGRclustalW{      rice} G..ALPSHRL ESRLGDCRRA ARLRREALR. ....RVTGRG
..VEGLPFDG
HMGRclustalW{      corn} G..KVPSYAL EARLGDCRRA AGIRREALR. ....RITGRD
..IEGLPLDG
HMGRclustalW{wheat3} .....
.....
HMGRclustalW{wheat2} .....
.....
HMGRclustalW{      soybean} .....
.....
HMGRclustalW{rubbertre3} G..SIPSYSL ESKLGNCKRA ALIRRETLO. ....RMSGRS
..LEGLPLDG
HMGRclustalW{rosyperiwi} G..KIPSYSL ESKLGDCKRA AGIRREALQ. ....RITGKS
..LEGLPLEG
HMGRclustalW{      tomato} G..KIPSYSL ESKLGDCKRA ASIRKEVMQ. ....RITGKS
..LEGLPLEG
HMGRclustalW{woodtobacc} G..KMPSYSL ESKLGDCKRA ASIRKEALQ. ....RITGKS
..LEGLPLEG
HMGRclustalW{      potato} G..KTPSYSL ESKLGDCKRA ASIRKEALQ. ....RITGKS
..LEGLPLEG
HMGRclustalW{radish} G..VVPSYSL ESRLGDCKRA ASIRREALQ. ....RLTGRS
..IEGLPLDG
HMGRclustalW{arabadopsis1} G..VIPSYSL ESRLGDCKRA ASIRREALQ. ....RVTGRS
..IEGLPLDG
HMGRclustalW{cucumismel} G..SVPSYSL ESKLGDCKRA ASIRREALQ. ....RTTGRS
..IHGLPPEG
HMGRclustalW{rubbertre2} .....
.....
HMGRclustalW{rubbertre1} G..KIPSYSL ESKLGDCKRA AAIRREALQ. ....RMTRRS
..LEGLPVEG
HMGRclustalW{camptothec} G..TTPSYAL ESKLGDCKRA AAIRREALQ. ....RMTKKS
..LAGLPLDG
HMGRclustalW{arabadops2} G..TIPSYSL ETKLGDCKRA AAIRREAVQ. ....RITGKS
..LTGLPLEG
HMGRclustalW{chineseham} K..HIPAYKL ETLMETHERG VSIRRQLLST K..LPEPSS.
..LQYLPYRD

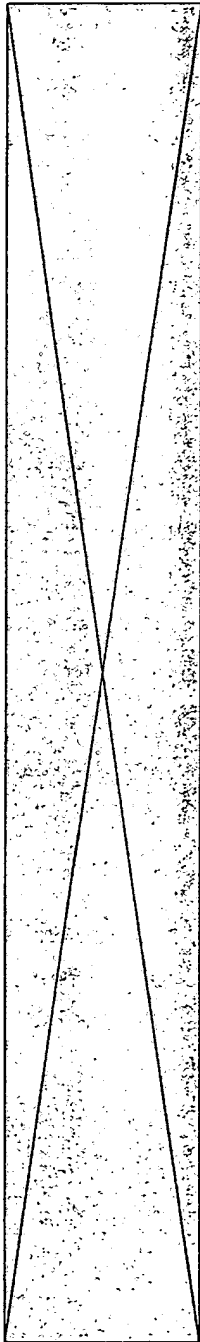
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LEGLPYEG

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HMGRclustalw{methanobac}	IDMERASRRN	IENPIGVVQI	PLGVAGPLRV	RGEHADGEYY
VPLATSEGA				
HMGRclustalw{methanococ}	IDEEMAMKKN	IENMIGAIQI	PLGFAGPLKI	NGEYAKGEFY
IPLATTEGA				
HMGRclustalw{halobacter}	FPAEAAES.A	IENMVGSIQV	PMGVAGPVS	DGGSVAGEKY
LPLATTEGA				
HMGRclustalw{sulfolobus}	IDYSEIKNKN	AENVIGAIQI	PLGIVGPIRV	NGDYAKGDFY
VPMATTEGA				
HMGRclustalw{yeast2}	YDYDRVFGAC	CENVIGYMPI	PVGIVIGPLII	DGT....SYH
IPMATTEGCL				
HMGRclustalw{yeast1}	YDYDRVFGAC	CENVIGYMPL	PVGIVIGPLVI	DGT....SYH

IPMATTEGCL
HMGRclustalW{phycomyces}
PMATTEGCL
HMGRclustalW{ fusarium} YNWERFFGAC CENVIGYMPL PVGVAGPLVI DGQ....SYF
IPMATTEGVL
HMGRclustalW{ candida} YDYDRVFGAC CENVIGYMPL PVGVAGPLII DGK....PYH
IPMATTEGCL
HMGRclustalW{dictyoste2} FDYTKVLGAC CENVIGYIPI PVGVAGPILL DGK....LVS
IPMATTEGCL
HMGRclustalW{wheat1}
HMGRclustalW{ rice} MDYQAILGQC CEMPVGIVVQL PVGVAGPLLL DGR....EYH
VPMATTEGCL
HMGRclustalW{ corn} FDYASILGQC CELPVGVVQL PVGVAGPLLL DGR....RFY
LPMATTEGCL
HMGRclustalW{wheat3}
HMGRclustalW{wheat2}
HMGRclustalW{ soybean}
HMGRclustalW{rubbertre3} FDYESILGQC CEMAIGYVQI PVGIAGPLLL DGK....EYT
VPMATTEGCL
HMGRclustalW{rosyperiwi} FDYASILGQC CEMPVGIVVQL PVGIAGPLLL DGR....EYM
LPMATTEGCL
HMGRclustalW{ tomato} FNYESILGQC CEMPIGYVQI PVGIAGPLLL NGK....EFS
VPMATTEGCL
HMGRclustalW{woodtobacc} FDYESILGQC CEMPIGYVQI PVGIAGPLLL DGR....EYS
VPMATTEGCL
HMGRclustalW{ potato} FDYSSILGQC CEMPVGIVVQI PVGIAGPLLL DGR....EYS
VPMATTEGCL
HMGRclustalW{radish} FDYDSILGQC CEMPVGIIQI PVGIAGPLLL DGY....EYS
VPMATTEGCL
HMGRclustalW{arabadopsis1} FDYESILGQC CEMPVGIIQI PVGIAGPLLL DGY....EYS
VPMATTEGCL
HMGRclustalW{cucumismel} FDYESILGQC CEMPVGIVVQI PVGIAGPLLL DGF....EYT
VPMATTEGCL
HMGRclustalW{rubbertre2}
HMGRclustalW{rubbertre1} FDYESILGQC CEMPVGIVVQI PVGIAGPLLL NGR....EYS
VPMATTEGCL
HMGRclustalW{camptothec} FDYDSILGQC CEMPVGIVVQI PVGIAGPLLL DGR....EYS
VPMATTEGCL
HMGRclustalW{arabadops2} FDYNSILGQC CEMPVGIVVQI PVGIAGPLLL DGV....EYS
VPMATTEGCL
HMGRclustalW{chineseham} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ
VPMATTEGCL
HMGRclustalW{chineseha2} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ
VPMATTEGCL
HMGRclustalW{syrianhamst} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ
VPMATTEGCL
HMGRclustalW{ rat} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DGK....EYQ
VPMATTEGCL
HMGRclustalW{ rabbit} YNYSLVLGAC CENVIGYMPI PVGVVGPLCL DGK....EFQ
VPMATTEGCL
HMGRclustalW{ human} YNYSLVMGAC CENVIGYMPI PVGVAGPLCL DEK....EFQ
VPMATTEGCL
HMGRclustalW{ mouse}
HMGRclustalW{ xenopus} YNYSLVMGAC CENVIGYMPI PVGVAGPLLL NNK....EYQ

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VPMATTEGCL
  HMGRclustalW{sea urchin} YDYSFVSGAC CENVIGYMPV PVGVAGPLLL DGQ....EFQ
VPMATTEGCL
  HMGRclustalW{ cockroach} YDYLKVMGAC CENVIGYMPV PVGVAGPLNL DGR....LVH
VPLATTEGCL
  HMGRclustalW{drosophila} FDYRKVLNAC CENVLGYPVI PVGYAGPLLL DGE....TTY
VPMATTEGAL
  HMGRclustalW{dictyostel} FDFAKVQGQC CENVIGYPVI PVGTAGPIQL NGQ....LVT
IPMATTEGCL
  HMGRclustalW{schistosom} YDYRLVYGQC CEEVIGYMPI PVGKIGPLLL DGR....SHY
IPLATTEGCL
  HMGRclustalW{archaeoglo} .LPLDVADRM IENVIGTFEL PLGIATNFLI DGK....DYL
IPMAIEEPSV
  HMGRclustalW{pseudomonas} ALPMDIANGM IENVIGTFEL PYAVASNFQI NGR....DVL
VPLVVEPSI

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Consensus FDY-SVLG-C CENVIGY--I PVGVAGPLLL DGK---EYS

VPMATTEGCL

HMGCoA binding

E

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FIG.32EE

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800
 HMGRclustalW{methanobac} VASVNRGCSV ITRAGGATVR VTGDSMT.RA PVIRTGSVVE
 ALQLREWIYE
 HMGRclustalW{methanococ} VASVNRGCSI ITKCGGATVR VIDDKMT.RA PCLKTKSVVD
 AIKVRDWIRE
 HMGRclustalW{halobacter} LASVNRGCSV INSAGGATAR VLKSGMT.RA PVFRVADVAE
 AEALVSWTRD
 HMGRclustalW{sulfolobus} IASVNRGIKA VTLSGGVRAK VLKDEMT.RA PVFKFDSIEQ
 IPNFLKFIEE
 HMGRclustalW{ yeast2} VASAMRGCKA INAGGGATTV LTKDGMT.RG PVVRFPPTLIR
 SGACKIWLDS
 HMGRclustalW{ yeast1} VASAMRGCKA INAGGGATTV LTKDGMT.RG PVVRFPPTLKR
 SGACKIWLDS
 HMGRclustalW{phycomycetes} VASTARGCKA INAGGGASTI VIADGMT.RG PCVEFPPTILR
 AAACKLWIEN
 HMGRclustalW{ fusarium} VASASRGCKA INSGGGAITV LTADGMT.RG PCVAFETLER
 AGAAKLWLDS
 HMGRclustalW{ candida} VASAMRGCKA INLGGGVTTV LTKDGMT.RG PCVKFPSLKR
 AGQCKLWLDS
 HMGRclustalW{dictyoste2} VASTHRGAKA ITKSGGAKTV LLQSGMT.RA PVCRLPSSIR
 AGELKQWIEN
 HMGRclustalW{wheat1}

 HMGRclustalW{ rice} VASVNRVQGH LVS GGAFSV LLRDAMS.RA PAVKLPCPMR
 AAELKAFAEA
 HMGRclustalW{ corn} VASTNRGCKA IAESGGATSV VLRDAMT.RA PVARFPPTARR
 AAELKAFLED
 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3} VASANRGCKA IYASGGATSV LLRDGMT.RA PVVRFPPTAKR
 AADLKFFMED
 HMGRclustalW{rosyperiwi} VASTNRGCKA ILASGGANSV LLRDGMT.RA PVVRFGTAKR
 AAELKFYMED
 HMGRclustalW{ tomato} VASTNRGCKA IYASGGATCI LLRDGMT.RA PCVRFGTAKR
 AAELKFFVED
 HMGRclustalW{woodtobacc} VASTNRGCKA IYASGGATSV LLRDGMT.RA PCVRFGTAKR
 AAELKFFVED
 HMGRclustalW{ potato} VASTNRGCKA IFVSGGADSV LLRDGMT.RA PVVRFTTAKR
 AAELKFFVED
 HMGRclustalW{radish} VASTNRGCKA MYVSGGATST VLKDEMT.RA PVVRFASARR
 ASELKFFLES
 HMGRclustalW{arabadopsis1} VASTNRGCKA MFISGGATST VLKDEMT.RA PVVRFASARR
 ASELKFFLEN
 HMGRclustalW{cucumismel} VASTNRGCKA IYASGGATSM LLKDEMT.RA PVVRFGSAKR
 ASELKFFLED
 HMGRclustalW{rubbertre2}

 HMGRclustalW{rubbertrel} VASTNRGCKA IYLSGGATSV LLKDEMT.RA PVVRFASATR
 AAELKFFLED
 HMGRclustalW{camptothec} VASTNRGCKA IFACGGATSV LLRDAMT.RA PVVRFGSAKR
 AADLKFFLEN
 HMGRclustalW{arabadops2} VASTNRGCKA IHLGGGAFSV LVKDAMT.RA PVVRFPSARR
 AALVMFYLQD
 HMGRclustalW{chineseham} VASTNRGCRA IGLGGGASSR VLADGMT.RG PVVRLPRACD
 SAEVKAWLET

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HMGRclustalW{chineseha2}	VASTNRGCRA	IGLGGGASSR	VLADGMT.RG	PVVRLPRACD
SAEVKAWLET				
HMGRclustalW{syrianhamst}	VASTNRGCRA	IGLGGGASSR	VLADGMT.RG	PVVRLPRACD
SAEVKAWLET				
HMGRclustalW{ rat}	VASTNRGCRA	ISLGGGASSR	VLADGMS.RG	PVVRLPRACD
SAEVKSWLET				
HMGRclustalW{ rabbit}	VASTNRGCRA	ICLGGGASSR	VLADGMT.RG	PVVRLPRACD
SAEVKAWLET				
HMGRclustalW{ human}	VASTNRGCRA	IGLGGGASSR	VLADGMT.RG	PVVRLPRACD
SAEVKAWLET				
HMGRclustalW{ mouse}	.....	.....	.....	.....
.....				
HMGRclustalW{ xenopus}	VASTNRGCRA	IMLGGGAKSR	VLADGMT.RG	PVVRLPTACD
AAEVKAWLDS				
HMGRclustalW{sea urchin}	VASTNRGCRA	LRSAGGIHSV	LIGDGMT.RG	PLVRLPSAQE
AGAIKWLEW				
HMGRclustalW{ cockroach}	VASTNRGMRA	LMRCG.VTSR	IVADGMT.RG	PVVRFPNIDR
ASEAMLWMQV				
HMGRclustalW{drosophila}	VASTNRGCKA	LSVRG.VRSV	VEDVGMT.RA	PCVRFPSVAR
AAEAKSWIEN				
HMGRclustalW{dictyostel}	VASTHRGCKA	ITESGGAKCT	ITSRGMT.RA	PVVRFSDIVK
ASEFVSWIND				
HMGRclustalW{schistosom}	VASTNRGCRA	IFLAGGIKSV	VYRDQMT.RA	PVVWFPSIID
SVKCIWIDS				
HMGRclustalW{archaeoglo}	VAAASNAARM	ARESGGFTTD	YTGSLMIGQI	QVTKLLNPNA
AKFEVLRQKD				
HMGRclustalW{pseudomonas}	VAAASYMAKL	ARANGGFTTS	SSAPLMHAQV	QIVGIQDPLN
ARLSLLRRKD				
	Consensus	VASTNRGCKA	I-LSGGATSV	VLADGMT-RA
AAELKFWLED				PVVRFPSAKR

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FIG. 3266

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HMGRclustalW{chineseha2}	PEGFAVIKDA	FDSTSRFARL	QKLHV.....	TMAGRNLVIR
FQSKTGDMG				
HMGRclustalW{syrianhamst}	PEGFAVIKDA	FDSTSRFARL	QKLHV.....	TMAGRNLVIR
FQSKTGDMG				
HMGRclustalW{ rat}	PEGFAVVKEA	FDSTSRFARL	QKLHV.....	TLAGRNLVIR
LQSKTGDMG				
HMGRclustalW{ rabbit}	PEGFAVIKEA	FDSTSRFARL	QKLHI.....	SMAGRNLVIR
FQSR TGDMG				
HMGRclustalW{ human}	SEGFAVIKEA	FDSTSRFARL	QKLHT.....	SIAGRNLVIR
FQSRSGDMG				
HMGRclustalW{ mouse}	.....	.....	.....	.....
.....				
HMGRclustalW{ xenopus}	AEGFKVIKDA	FDSTSRFARL	GRLQN.....	CVAGRNLVIR
FQSKTGDMG				
HMGRclustalW{sea urchin}	PENFAAIKER	FESTSRFAKL	KSIQT.....	ALAGRYMFLR
FKALTGDAMG				
HMGRclustalW{ cockroach}	PYNFEQIKKN	FDSTSRFARL	SKIHI.....	RVAGRHLFIR
FIATTGDAMG				
HMGRclustalW{drosophila}	DENYRVVKTE	FDSTSRFGRL	KDCHI.....	AMDGPQLVIR
FVAITGDRMG				
HMGRclustalW{dictyostel}	TDNYQALKAV	FDSTSRFARL	SAIKC.....	TIAGRSVYIR
FKCDTGDMG				
HMGRclustalW{schistosom}	EEGFQTLKSA	FDKTSAHVNL	LSVFA.....	CPAGRYIHIR
FAARTGDAMG				
HMGRclustalW{archaeoglo}	EIIERANEC	PMLVNLGGGC	KDIEAR.VID	TIMGKMLIVH
LIVDVKDAMG				
HMGRclustalW{pseudomonas}	EIIELANR	QLLNSLGGGC	RDIEVHTFAD	TPRGPMVAH
LIVDVRDAMG				
Consensus	PENFETLK-A	FNSTSRFARL	QSIQC-----	AIAGRNLVIR
FSCSTGDAMG				

NADH binding domain 1

(continued)

FIG. 32II

900
 HMGRclustalW{methanobac} MNMVTIATER ALELLT...R ETGAHV..IA LSGNLCTDKK
 PAAVNLIIEGR
 HMGRclustalW{methanococ} MNMVTIATEK ACNFIEGELK KEGIFVKTVV VSGNACVDKK
 PSGMNLINGR
 HMGRclustalW{halobacter} MNMATIATEA VCGVVE...A ETAASL..VA LSGNLCSDKK
 PAAINAVEGR
 HMGRclustalW{sulfolobus} MNMVTIAVEK VCEFIE.... ENFPSADCLA VSGNMCSDKK
 QTNVNSLFGR
 HMGRclustalW{ yeast2} MNMISKGVEY SLKQMVVEY. .GWEDMEVVS VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{ yeast1} MNMISKGVEY SLKQMVVEY. .GWEDMEVVS VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{phycomyces} MNM.....

 HMGRclustalW{ fusarium} MNMISKGVEH ALSVMANDG. .GFDDMQIIS VSGNYCTDKK
 AAALNWIDGR
 HMGRclustalW{ candida} MNMISKGVEY ALKQMTVEF. .GWDDMMVVS VSGNYCTDKK
 PAAVNWINGR
 HMGRclustalW{dictyoste2} MNMVSKGVEK ALEVITEY.. ..FPMEVLS LSGNVCTDKK
 PSSINWLEGR
 HMGRclustalW{wheat1} MNMVSKGVEN VLGYIRNN.. ..FPDMDVIS ISGNYCSDKK
 ATAVNWIDGR
 HMGRclustalW{ rice} MNMVSKGVEN VLGYLQNV.. ..FPDMDVIS VSGNYCSDKK
 PTAVNWIEGR
 HMGRclustalW{ corn} MNMVSKGVQV VLDLQDD.. ..FHDMDVIS ISGNFCSDKK
 PSAVNWIEGR
 HMGRclustalW{wheat3} MNMISKGVQV VLDYLQDD.. ..FPDMDVIS ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{wheat2} MNMISKGVQH VLDYLEED.. ..FPDMDVVS ISGNFCSDKK
 SAAVNWIEGR
 HMGRclustalW{ soybean}

 HMGRclustalW{rubbertre3} MNMVSKAVQV VIDYLQND.. ..FPDMDVIG LTGNFCADKK
 AAAVNWIEGR
 HMGRclustalW{rosyperiwi} MNMVSKGVQV VLEFLQTD.. ..YPDMDVLG ISGNFCADKK
 PAAVNWIEGR
 HMGRclustalW{ tomato} MNMVSKGVQV VLDYLQNE.. ..YPDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{woodtobacc} MNMVSKGVQV VLDYLQNE.. ..YPDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{ potato} MNMVSKGVQV VLDYLQSE.. ..YPDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{radish} MNMVSKGVQV VLEFLTED.. ..FPDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{arabadopsis1} MNMVSKGVQV VLEYLTDD.. ..FPDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{cucumismel} MNMVSKGVQV VLEFLQHD.. ..FSDMEVIG ISGNFCADKK
 PAAVNWIEGR
 HMGRclustalW{rubbertre2}LESD.. ..FADMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{rubbertre1} MNMVSKGVQV VLEFLQSD.. ..FSDMDVIG ISGNFCSDKK
 PAAVNWIEGR
 HMGRclustalW{camptothec} MNMISKGVQV VLDLQDD.. ..FPDMDVIG ISGNYCSDKK
 PAAVNWIEGR
 HMGRclustalW{arabadops2} MNMVSKGVQV VLDFVKSE.. ..FPDMDVIG ISGNYCSDKK
 ASAVNWIEGR
 HMGRclustalW{chineseham} MNMISKGTEK ALLKLQEF.. ..FPEMQILA VSGNYCTDKK
 PAAINWIEGR

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HMGRclustalW{chineseha2} MNMISKGTEK ALLKLQEF.. ..FPEMQILA VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{syrianhamst} MNMISKGTEK ALVKLQEF.. ..FPEMQILA VSGNYCTDKK
 PAAVNWIEGR
 HMGRclustalW{ rat} MNMISKGTEK ALLKLQEG.. ..VPELQILA VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{ rabbit} MNMISKGTEK ALSKLHEY.. ..FPEMQILA VSGNYCTDKK
 PAAVNWIEGR
 HMGRclustalW{ human} MNMISKGTEK ALSKLHEY.. ..FPEMQILA VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{ mouse}EK ALLKLQEF.. ..FPDMQILA VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{ xenopus} MNMISKVTEQ ALARLQEE.. ..FPDLHVLA VSGNYCTDKK
 PAAINWIEGR
 HMGRclustalW{sea urchin} MNMISKGTEQ ALHALQTM.. ..FPNIEIMS LSGNYCTDKK
 VAAINWIEGR
 HMGRclustalW{ cockroach} MNMLSKGTEV ALAYVQQV.. ..YPDMEILS LSGNFCTDKK
 PAAVNWIEGR
 HMGRclustalW{drosophila} MNMVSKALRW PFAEFTLH.. ..FPDMQIIS LSGNFCCDKK
 PAAINWIKGR
 HMGRclustalW{dictyostel} MNMVSKGVEA VLEHLKII.. ..FDDMTLLS ISGNMCTDKK
 PSSINWTEGR
 HMGRclustalW{schistosom} MNMVSKATDS ALHCLKKY.. ..FSNMQVIS LSGNMCTDKK
 PATINTILGR
 HMGRclustalW{archaeoglo} ANAVNTMCEK VAPFIERITG .GKVYLRIIS NLAAYRLARA
 KAVFDKDVIG
 HMGRclustalW{pseudomonas} ANTVNTMAEA VAPLMEAITG .GQVRLRILS NLADLRLARA
 QVRITPQQLE

 Consensus MNMVSKGVEN VL--LQED-- -GFPDMDVIS ISGNYCTDKK
 PAAVNWIEGR

NADH binding domain 1 (concluded)

FIG. 32 KK

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950
 HMGRclustalW{methanobac} GKSITAEITV PGEMVESVLK TTPEAVVEVN TAKNLIGSAA
 AG..SMG.FN
 HMGRclustalW{methanococ} GKSIVAEVFL TEKEVNKYLK TTSQAIAEVN RLKNYIGSAI
 SN..SMG.FN
 HMGRclustalW{halobacter} GRSVTADVRI PREVVEERLH TTPERGRELN TRKNLVGSAK
 AA..SLG.FN
 HMGRclustalW{sulfolobus} GKTVLAEALI KKDVRNHLH SNAQLIHDIN LRKNWLGTAR
 AG..SLSQFN
 HMGRclustalW{ yeast2} GKSVVAEATI PGDVVKSVLK SDVSALVELN ISKNLVGSAM
 AG..SVGGFN
 HMGRclustalW{ yeast1} GKSVVAEATI PGDVVRKVLK SDVSALVELN IAKNLVGSAM
 AG..SVGGFN
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} GKGVVAEAI PGEVVRSVLK SDVDSLVELN VAKNLIGSAM
 AG..SVGGFN
 HMGRclustalW{ candida} GKSVVAEASI PKDAVVKVLK SSVKAVVDVN VNKNLIGSAM
 AG..SVGGFN
 HMGRclustalW{dictyoste2} GKSVVAEAVI SGDIVRDVLK TTVEALVSLN IDKNLIGSAM
 AG..SIGGFN
 HMGRclustalW{wheat1} GKSVVCEATI KGRVVQSVID TTVEKLVELN IIKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{ rice} GKSVVCEAII KGDVVQKVLK TTVEKLVELN IIKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{ corn} GKSVVCEAVI GEEVVKVLK TDVQSLVELN TIKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{wheat3} GKSVVCEAVI REELLKKVLK TNVQSLVELN VIKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{wheat2} GKSVVCEAII REEVVEKVLK TNVQSLVELN VIKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{ soybean}LK TNVSALVELN MLKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{rubbertre3} GKSVVCEAII KEEVVKVLK TNVAALVELN MIKNLTGSAV
 AG..SLGGFN
 HMGRclustalW{rosyperiwi} GKSVVCEAII KEEIVKTVLK TEVAALIELN MVKNLAGSAI
 AG..ALGGFN
 HMGRclustalW{ tomato} GKSVVCEAII TEEVVKVLK TEVAALVELN MLKNLTGSAM
 AG..ALGGFN
 HMGRclustalW{woodtobacc} GKSVVCEAII TEEVVKVLK TEVAALVELN MLKNLTGSAM
 AG..ALGGFN
 HMGRclustalW{ potato} GKSVVCEAII KEEVVKVLK TEVAALVELN MLKNLTGSAM
 AG..ALGGFN
 HMGRclustalW{radish} GKSVVCEAVI RGETVNKVLK TSVASLVELN MLKNLTGSAI
 AG..SLGGFN
 HMGRclustalW{arabadopsis1} GKSVVCEAVI RGEIVNKVLK TSVAALVELN MLKNLAGSAV
 AG..SLGGFN
 HMGRclustalW{cucumismel} GKSVVCEAVI KDEVVRKVLK TSVASLVELN MLKNLTGSAM
 AG..ALGGFN
 HMGRclustalW{rubbertre2} GKSVVCEAII KEEVVKVLK TDVALLVELN MLKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{rubbertrel1} GKSVVCEAII KEEVVKVLK TNVASLVELN MLKNLAGSAV
 AG..ALGGFN
 HMGRclustalW{camptothec} GKSVVCEAVI KEEVVKVLK TNVASLVELN MLKNLTGSAM
 AG..ALGGFN
 HMGRclustalW{arabadops2} GKHVCEAFI KAEIVEKVLK TSVEALVELN TLKNLVGSAM
 AG..SLGGFN
 HMGRclustalW{chineseham} GKTIVCEAVI PAKVVREVLK TTTEAMIDVN INKNLVGSAM

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AG..SIGGYN
  HMGRclustalW{chineseha2} GKTVVCEAVI PAKVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{syrianhamst} GKTVVCEAVI PARVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      rat} GKTVVCEAVI PAKVVREVLK TTTEAMVDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      rabbit} GKTVVCEAVI PAKVVREVLK TTTEAMIDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      human} GKSVVCEAVI PAKVVREVLK TTTEAMIEVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      mouse} GKTVVCEAVI PAKVVREVLK TTTEAMVDVN INKNLVGSAM
AG..SIGGYN
  HMGRclustalW{      xenopus} GKSVVCEAVI PAKVVREVLK SSTEALVEVN INKNFIGSAM
AG..SIGGYN
  HMGRclustalW{sea urchin} GKSVVCEATV PAHIVQQVLK TSASALVDLN IHKNLVGSAM
AG..SIGGFN
  HMGRclustalW{cockroach} GKSVVCEAIV PADIKSVLK TSVQALMDVN ITKNLIGSAV
AG..SIGGFN
  HMGRclustalW{drosophila} GKRVTCTI SAATLRSVLK TDAKTLVECN KLKNMGGSAM
AG..SIGGNN
  HMGRclustalW{dictyostel} GRSVVCEAMI TGDVVQRVLK TNVQALVDLN IAKNLIGSAM
AG..SIGGFN
  HMGRclustalW{schistosom} GKSVIAEAHL SADVLAQVLH TNAQRLARLT HSKNWIGSAM
AGCPGMMGCN
  HMGRclustalW{archaeoglo} .....GEEVV EGIMLAYAFA AADPFRATH NKGIMNGISA
LM.....
  HMGRclustalW{pseudomonas} TAEFSGEAVI EGILDAYAFA AVDPYRAATH NKGIMNGIDP
LI.....

Consensus GKSVVCEAVI PAEVVRKVLK TTVEALVELN ILKNLVGSAM AG--
SLGGFN

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.....EDLYI
  HMGRclustalW{chineseha2}  AHAANIVTAI YIACGQDAAQ NVGSSNCITL MEASGPTN..
.....EDLYI
  HMGRclustalW{syrianhamst} AHAANIVTAI YIACGQDAAQ NVGSSNCITL MEASGPTN..
.....EDLYI
  HMGRclustalW{      rat}    LHAANIVTAI YIACGQDAAQ NVGSSNCITL MEASGPTN..
.....EDLYI
  HMGRclustalW{      rabbit} AHAANYVTAI YIACGQDAAQ NVGSSNCITL MEASGPPN..
.....EDLYI
  HMGRclustalW{      human}  AHAANIVTAI YIACGQDAAQ NVGSSNCITL MEASGPTN..
.....EDLYI
  HMGRclustalW{      mouse}  AHAANIVTAI YIACGQDAAQ NVGSSNCITL MEASGPTN..
.....EDLYI
  HMGRclustalW{  xenopus}    AHAANIVTAI YIACGQDAAQ NVGSSNCITI MEATGPTY..
.....EDLYI
  HMGRclustalW{sea urchin}   AHAANIVTAI YIATGQDAAQ NIASSNCMTL METRGPKG..
.....GDLYL
  HMGRclustalW{ cockroach}   AHAANIVTAI FIATGQDPAQ NVGSSNCMTL MEPWGEDG..
.....KDLYV
  HMGRclustalW{drosophila}   AHAANMVTAV FLATGQDPAQ NVTSSNCSTA MECWAENS..
.....EDLYM
  HMGRclustalW{dictyostel}   AHASNIVTAI FLATGQDCAQ NVESSNCITQ MEACNDG...
.....QDLYI
  HMGRclustalW{schistosom}   AHAANIIAGM FAATGQDLAQ VVDSSSCLTQ LEVDLSD...
.....DSLVA
  HMGRclustalW{archaeoglo}   ..... .IATGNDFRA IEAGAHSYAA IGG.YKPLTT
YEVDRKGNLV
  HMGRclustalW{pseudomonas}  ..... .VATGNDWRA VEAGAHAYAC RSGHYGSLTT
WEKDNNGHLV

                                Consensus AHAANIVTAI FIATGQDPAQ NVESSNCITM MEAVNDGN-- -----
KDLHI

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D

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1050
 HMGRclustalW{methanobac} AVNLPDVPLA TVGGGTGLET ASECLDIMGV RGGG.....
 RVHAFAEIVG
 HMGRclustalW{methanococ} SVTLPDVPIG TVGGGTRVET QKECLEMLGC YGDN.....
 KALKFAEIVG
 HMGRclustalW{halobacter} SVSIASLEVG TVGGGTKLPT QSEGLDILGV SGGGDP.AGS
 NADALAEICIA
 HMGRclustalW{sulfolobus} SVTLPSLEVG TVGGGTRLPT QKEALSIMGV YGSGNP.PGS
 NAKKLAEIIA
 HMGRclustalW{ yeast2} SVSMPSIEVG TIGGGTVLEP QGAMLDLLGV RGPHPTEPGA
 NARQLARIIA
 HMGRclustalW{ yeast1} SVSMPSIEVG TIGGGTVLEP QGAMLDLLGV RGPHTAPGT
 NARQLARIVA
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} SVSMPSLEVG TLGGGTILEP QGAMLDILGV RGSHTPNPGD
 NARRLARIIG
 HMGRclustalW{ candida} SVSMPSIEVG TIGGGTILDP QGSMLELLGV RG.PADVPGE
 NARQLAKIVA
 HMGRclustalW{dictyoste2} SVTMPSIEVG TVGGGTHLPA QSACLDLLKI RGANLERPGA
 NSEQLARVVA
 HMGRclustalW{wheat1} SVTMPPIEV.

 HMGRclustalW{ rice} SVTMPSIEVG TIGGGTCLAS QAACLNLLGV KGSNHGSPGA
 NAGRLATIVA
 HMGRclustalW{ corn} SVTMPSIEVG TVGGGTQLAS QSACLDLLGV RGASRDRPGS
 NARLLATVVA
 HMGRclustalW{wheat3} SVTMPPIEV.

 HMGRclustalW{wheat2} SVTMPPIEV.

 HMGRclustalW{ soybean} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKESPGS
 NSRLLATIVA
 HMGRclustalW{rubbertre3} SVSMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKDSPGS
 NSRLLATIVA
 HMGRclustalW{rosyperiwi} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKDSPGA
 NSRLLATIVA
 HMGRclustalW{ tomato} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGANREAPGS
 NARLLATVVA
 HMGRclustalW{woodtobacc} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGANREVPGS
 NARLLATIVA
 HMGRclustalW{ potato} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGANRDAPGS
 NARLLATIVA
 HMGRclustalW{radish} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKESPGM
 NSRLLATIVA
 HMGRclustalW{arabadopsis1} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASTESPGM
 NARRLATIVA
 HMGRclustalW{cucumismel} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKESPGA
 NSRLLATIVA
 HMGRclustalW{rubbertre2} SVTLPSIEVG TVGGGTQLAS QSACLNLLGV MGACKESPGS
 YSRLLATIVA
 HMGRclustalW{rubbertrel} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGANKESPGS
 NSRLLAAIVA
 HMGRclustalW{camptothec} SVTMPSIEVG TVGGGTQLAS QSACLNLLGV KGASKEAPGS
 NARLLATIVA
 HMGRclustalW{arabadops2} SVSMPCIEVG TVGGGTQLAS QAACLNLLGV KGSNNKPGS
 NAQQLARIVA
 HMGRclustalW{chineseham} SCTMPSIEIG TVGGGTNLLP QQACLQMLGV QGACKDNPGS
 NARQLARIVC

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HMGRclustalW{chineseha2}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDNPG
NARQLARIVC				
HMGRclustalW{syrianhamst}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDNPG
NARQLARIVC				
HMGRclustalW{rat}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDNPG
NARQLARIVC				
HMGRclustalW{rabbit}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDSPG
NARQLARIVC				
HMGRclustalW{human}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDNPG
NARQLARIVC				
HMGRclustalW{mouse}	SCTMPSIEIG	TVGGGTNLLP	QQACLQMLGV	QGACKDNPG
NARQLARIVC				
HMGRclustalW{xenopus}	SCTMPSIEIG	TVGGGTNLAP	QQACLQMLGV	QGASTETPGK
NACQLAQIVC				
HMGRclustalW{sea urchin}	SCTMPSIEIG	TVGGGTVLPP	QSACLQMDV	KGSNIHSGSL
NASQLARIVC				
HMGRclustalW{cockroach}	SCTMPSIEIG	TIGGGTVLPP	QAACLDMLGV	RGANEMCPGE
NANTLARIVC				
HMGRclustalW{drosophila}	TCTMPSIEVG	TVGGGTGLPG	QSACLEMLGV	RGAHATRPGE
NAKKLAQIVC				
HMGRclustalW{dictyostel}	TVTMSIEVG	TVGGGTSLPA	QSACLDIIGV	KGSSSSKPGA
NADQLAKTIA				
HMGRclustalW{schistosom}	SVTMPCIEVG	TVGGGTRLSP	QRACLDLLDL	SV....D.R
PTEHLSRIIA				
HMGRclustalW{archaeoglo}	GTIEIPMAVG	VIGGATKVP	LAKISLKILG	VNTAEELARV AAAL
HMGRclustalW{pseudomonas}	GTLEMPMPVG	LVGGATKTHP	LAQLSLRILG	VKTAQALAEI AVAV
Consensus	SVTMPSIEVG	TVGGGTQLAP	QSACLNLLGV	KGA-KESPGS
NARQLARIVA				

NADH binding domain 2

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FIG.32 QQ

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1100
 HMGRclustalW{methanobac} GAVLAGELSL MGALAAGHLA RAHSELGRG.

 HMGRclustalW{methanococ} AAVLAGELSL LGALAAGHLG KAHQELGR..

 HMGRclustalW{halobacter} VGSLAGELSL LSALASRHLS SAHAELGR..

 HMGRclustalW{sulfolobus} STVLSGELNL LAALSNKELG KAHAKLGRAM KV.....

 HMGRclustalW{ yeast2} CAVLAGELSL CSALAAGHLV QSHMTHNRK. ..TNKANELP
 QPS.....
 HMGRclustalW{ yeast1} CAVLAGELSL CAALAAGHLV QSHMTHNRKP AEPTKPNULD
 ATDI.....
 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} AAVLAGELSL CSALAAGHLV RAHMQHNRSA APSRSTTPGS
 SHDARLTGHD
 HMGRclustalW{ candida} SIVLSGELSL VSALAAGHLV QSHMQHNRAA AKK.....

 HMGRclustalW{dictyoste2} AAVLSGELSL MSALAAGHLV RSHLKHNRKT EAPAPQADTI
 SMTHNLPHSD
 HMGRclustalW{wheat1}

 HMGRclustalW{ rice} GSVVAGRALL LAALASGHLV KSHMMYNRSS KDVAK.....

 HMGRclustalW{ corn} GGVLAGELSL LSALAAGQLV KSHMKYNRSS KDVSS.....

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean} GSVLAGELSL MSAIAAGQLV NSHMKYNRSS KDVTK.....

 HMGRclustalW{rubbertre3} GSVLAGELSL MSAIAAGQLV NSHMKYNRSA KDVSK.....

 HMGRclustalW{rosyperiwi} GSVLAGELSL MSAISAGQLV RSHMKYNRSS KDITN.....

 HMGRclustalW{ tomato} GSVLAGELSL MSAISSGQLV NSHMKYNRST KDVTK.....

 HMGRclustalW{woodtobacc} GSVLAGELSL MSAISAGQLV KSHMKYNRST KDVTK.....

 HMGRclustalW{ potato} GSVLAGELSL MSAISAGQLV KSHMKYNRSI KDISK.....

 HMGRclustalW{radish} GAVLAGELSL MSAIAAGQLV RSHMKYNRSS RDISG.....

 HMGRclustalW{arabadopsis1} GAVLAGELSL MSAIAAGQLV RSHMKYNRSS RDISG.....

 HMGRclustalW{cucumismel} GSVLAGELSL MSAIAAGQLV RSHMKYNRSS RDVSK.....

 HMGRclustalW{rubbertre2} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS KDVSK.....

 HMGRclustalW{rubbertrel} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS KDMSK.....

 HMGRclustalW{camptothec} GSVLAGELSL MSAIAAGQLV NSHMKYNRSN KDVTK.....

 HMGRclustalW{arabadops2} GSVLAGELSL MSAIAAGQLV KSHMKYNRSS RDIGP.....

 HMGRclustalW{chineseham} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....

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.....
HMGRclustalW{chineseha2} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{syrianhamst} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      rat} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      rabbit} GTVMAGELSL MAALAAGHLV KSHMIHNRSK INLQD.....
.....
HMGRclustalW{      human} GTVMAGELSL MAALAAGHLV KSHMIHNRSK INLQD.....
.....
HMGRclustalW{      mouse} GTVMAGELSL MAALAAGHLV RSHMVHNRSK INLQD.....
.....
HMGRclustalW{      xenopus} STVMAGELSL MAALAAGHLV KSHMVHNRSK INLQD.....
.....
HMGRclustalW{sea urchin} ATVMAGELSL MSALAAGHLV KSHMKHNRSA LNIASPLPSI
DEVATHRRSK
HMGRclustalW{ cockroach} GTVLAGELSL MSALAAGHLV KSHMRHNRSS VSTSG.....
.....
HMGRclustalW{drosophila} ATVMAGELSL MAALVNSDLV KSHMRHNRSS IAVNSAN...
.....
HMGRclustalW{dictyostel} SAVMAGELSL MSALSAGHLM KSHLQYNRAK TN.....
.....
HMGRclustalW{schistosom} GTVLAAELSL MAALDTDDLK KAHMHFNRAK QSTNSHSCSH
STTTDNDNI
HMGRclustalW{archaeoglo} ..GLAQNFAA LRALATEGIQ RGHMELHARN LAIMAGATGD
EVDRVVEIMV
HMGRclustalW{pseudomonas} ..GLAQNLGA MRALATEGIQ RGHMALHARN IAVVAGARGD
EVDWVARQLV

Consensus GTVLAGELSL MSALAAGHLV KSHMK-NRSS KDVSK-----

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* †††

FIG. 32 SS

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1152
 HMGRclustalW{methanobac}

 HMGRclustalW{methanococ}

 HMGRclustalW{halobacter}

 HMGRclustalW{sulfolobus}

 HMGRclustalW{ yeast2}NKGPPCKT SALL.....

 HMGRclustalW{ yeast1}NRLKDGSV TCIKS.....

 HMGRclustalW{phycomyces}

 HMGRclustalW{ fusarium} QCPRALSVNN VDERRRYSEV KAIDE.....

 HMGRclustalW{ candida}

 HMGRclustalW{dictyoste2}

 HMGRclustalW{wheat1}

 HMGRclustalW{ rice}AAS.....

 HMGRclustalW{ corn}TTATEK TRQREVDV..

 HMGRclustalW{wheat3}

 HMGRclustalW{wheat2}

 HMGRclustalW{ soybean}IS.....

 HMGRclustalW{rubbertre3}ITF.....

 HMGRclustalW{rosyperiwi}IASSQL ESDS.....

 HMGRclustalW{ tomato}ASS.....

 HMGRclustalW{woodtobacc}ASS.....

 HMGRclustalW{ potato}

 HMGRclustalW{radish}ATTTT.....

 HMGRclustalW{arabadopsis1}ATTTTT TTT.....

 HMGRclustalW{cucumismel}LES.....

 HMGRclustalW{rubbertre2}AAS.....

 HMGRclustalW{rubbertrel}AAS.....

 HMGRclustalW{camptothec}ASS.....

 HMGRclustalW{arabadops2}SSQVNR

 HMGRclustalW{chineseham}LQGTCTK KSA.....

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HMGRclustalW{chineseha2}LQGTCTK KSA.....

 HMGRclustalW{syrianhamst}LQGTCTK KAA.....

 HMGRclustalW{ rat}LQGTCTK KAA.....

 HMGRclustalW{ rabbit}LEGACTK KAA.....

 HMGRclustalW{ human}LQGACTK KTA.....

 HMGRclustalW{ mouse}LQGTCTK KAA.....

 HMGRclustalW{ xenopus}LPGTCTK KAA.....

 HMGRclustalW{sea urchin} SVDFSALKES SAAAPGTCTA NAS.....

 HMGRclustalW{ cockroach}S ...EPSTPAC KS.....

 HMGRclustalW{drosophila}NP LNVTVSSCST IS.....

 HMGRclustalW{dictyostel}

 HMGRclustalW{schistosom} SNIYDNHNVA LSSKIPVTDN SDIRESVHSL HVKPFVPKSD
 LSVNPEISHY TM
 HMGRclustalW{archaeoglo} RDGKIRLDYA KEVLRLRS.

 HMGRclustalW{pseudomonas} EYHDVRADRA VALLKQKRGQ

 Consensus -----A ---LQGTCTK KAA-----

Figure 1: ClustalW alignment of forty-three non-redundant HMG-CoA reductase sequences to represent archaeobacterial, eubacterial, fungal, plant and animal groups. The putative functional domains in the alignment marked as described below are based on the three dimensional structure of *Pseudomonas mevalonii* HMGR (Lawrence et al., 1995): boxed-HMGRCoA binding domain, light shade-NAD(H) binding domain, underlined consensus- domains involved in catalysis, * underneath consensus and boldface-key histidine residue involved in catalysis. The putative phosphorylation site residues are marked with ‡ and boldface, and are located at the C-terminal region of the protein, adjacent to a highly conserved arginine, marked with † and boldface. Also indicated are the conserved Glu (E), Lys (K), and Asp (D) residues, marked by E, K, and D, respectively. These residues are thought to be critical in catalysis, based on the crystal structure (Taberero et al., 1999).

FIG. 32 uu